Atari ST Resource page 55

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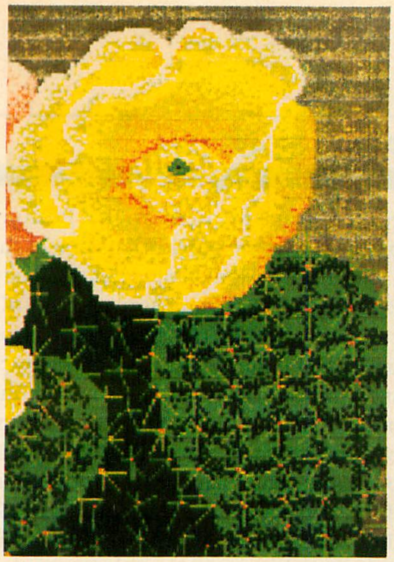
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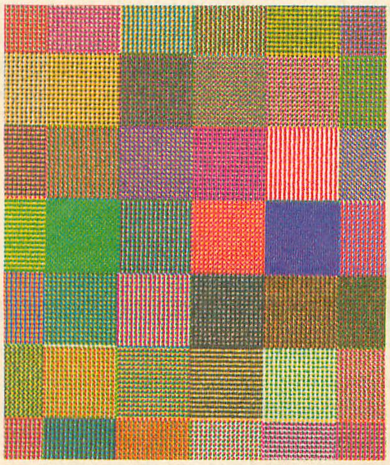
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The ATARI® Resource

OCTOBER 1986, VOLUME 5, NUMBER 6



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The Great Goto Debate 30

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November 1986, Volume 5, Number 6

Subsciptions: One year (12 issues) $28. Canada and Mexico add $8, other foreign add $12. Action Edition (12 issues with disks) $99.95, all foreign add $25.

Editorial submissions should include text and program listings on disk and paper. Submissions will be returned if stamped, self-addressed mailer is supplied. **Antic** assumes no responsibility for unsolicited editorial material.

I/O Board

NOT YET

Does the new Atari XMM801 printer work with Broderbund's Print Shop software?

Gary Vimr
CompuServe
ID 72407,2573

As this issue went to press, Broderbund said it was "too soon to tell" if the XMM801 will work with Print Shop. But by the time you read this, you should be able to get the information by calling Broderbund's tech support department at (415) 479-1170.—ANTIC ED

GOOD QUESTION

What is the significance of having 128K memory in the Atari 130XE, if only 16K can be accessed at one time, per program?

Brian Schade
Tucson, AZ

While it's true that you can only access a single 16K "window" into the 128K memory at one time, the time you devote to that particular 16K can be very, very short—fractions of a second. The 128K in the Atari 130XE is nothing more than 8 separate 16K blocks of memory. Your program may select any one of the 8 separate blocks to be active anytime, with virtually instantaneous switching. If you don't find what you're looking for in block 1, switch to block 2 and keep looking. If you run out of memory storage space in block 5, switch to Block # 6 and keep writing.—ANTIC ED

PLUGGING PLUGS

I was pleased to see my Tech Tip in the July, 1986 **Antic**. However, Alpha Products is no longer a source of the ST monitor plugs. The sole U.S. distributor is Interface Technology, Inc., 14440 Cherry Lane Court, Suite 219, P.O. Box 3040, Laurel MD 20708. (301) 490-3608.

Gary Grider
CompuServe
ID 71016,1000

AMDEK SHOPPING

To answer John Hawkins' question in the June, 1986 issue of **Antic**, Amdek 3-inch disk drive hardware and software may be purchased at the Computer Corner, 7101 Broadway, Merrillville, IN 46410. (219) 738-3282.

Mark Brewer
CompuServe
ID 74146,3665

ATARI BEATS IBM

For two years, we used two IBM PC computers here at the publications unit of the California Division of Mines and Geology. Recently, I began purchasng Atari 130XE computers and AtariWriter for staff geologists and editors. The ease with which staff learned to use them was amazing, and none had any previous computer experience. Small database jobs, word processing and management statistics are done on the Ataris. Each station has a 1050 disk drive, Comrex amber monitor and Star SG-10 printer.

After suffering verbal abuse from my mainframe and IBM friends for buying Ataris, the wisdom of the purchase became undeniable. With little dollar investment and no formal training, productivity has increased.

John Rapp
Department of
Conservation
Sacramento, CA

DIRECT CONNECTIONS

*Commenting about the August, 1986 Online issue of **Antic**, regular contributor Chris Chabris points out that in the general computer world, "direct-connect" modems are those which plug directly into telephone lines via standard modular outlets, instead of the old-fashioned acoustic couplers with their rubber cups.*

***Antic's** August stories tended to define direct-connect as it applies primarily to the Atari world—modems that plug directly into 8-bit Atari computers without requiring an 850 interface or other RS-232 connection.*—ANTIC ED

SOUTH PACIFIC BBS

I am running a BBS here on Kwajalein Island in the Marshall Islands with a 130XE, a Supra 10 megabyte hard disk and Bulletin Board Construction Set software. However, our phone system does not allow us to log onto the wonderful world of U.S. bulletin boards. We would be willing to pay a small fee for floppy captures of messages that are on U.S. boards.

Al Anderson
Kwajalein
Atari Users Group
Box 1065
APO San Francisco, CA
96555

continued on page 8

IO BOARD
continued from page 6

EPROM ERRORS

I really enjoyed *Build Your Own EPROM Burner* in the December, 1985 **Antic**. After constructing the circuit board, I found that I can successfully program an EPROM, but the read function returns many random errors which change every time a read is done. I have double-checked the circuit completely. Have any readers experienced the same problem?

Allen Hurst
CompuServe
ID 70206,137

*Some readers have built 800XL EPROMS that will work on an 800, but will not work on their 130XEs. Charles Cherry, who built and tested the do-it-yourself EPROM burner for **Antic** says slight manufacturing differences between 800XLs could be the cause of some 800XL incompatibilities. And as far as he knows, the EPROM burner will not work with the 130XE.*— ANTIC ED

RECIPE CONVERTER

The *Recipe Converter* (**Antic**, June 1986) is great. I sell food to restaurants, hospitals and schools. And now I use this program to help them convert home recipes to larger portions.

Rick Stamper
Houlton, Maine

MOUSE THAT ROARS

Thank you for your review of Sound Mouse in the June, 1986 **Antic**. We couldn't be more pleased with it. However, we have now reduced the price from $39.95 to $29.95.

Larry Gentieu
Sound Soft, Inc.

FOREIGN FONTS

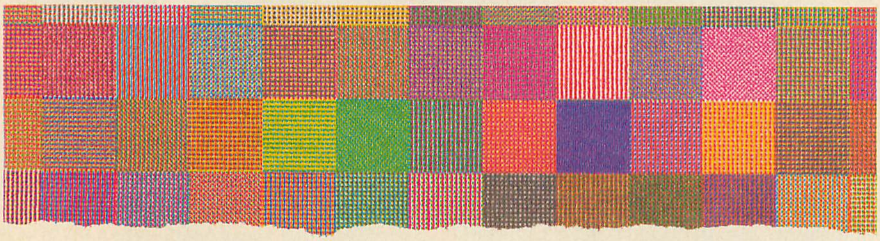
In response to Elisas Leousis' April, 1986 **Antic** I/O Board query about a foreign language ST Font editor: We are currently working on a general purpose editor to handle 7,000 Chinese characters broken up into 128 character fonts. The technique we are using will be applicable to other foreign languages by late 1986.

Con Neri
Xenotron
Victoria, Australia

COLORS!

If any of you dug deep into your pockets after reading about the Radio Shack CGP-220 color inkjet printer in the February, 1986 **Antic**—or if you own the nearly identical Canon PJ-1080-A—here's a demo program to try. It gives an idea of the wide range of effective colors possible with these printers through RGB mixing.

Judson Pewther
New York, NY



```
IU 10 REM COLOR DEMO CANON PJ-1080A
SN 20 DIM S(3),P1$(240),P2$(240)
FY 30 REM SET BITS: NONE,ODD,EVEN,ALL:
HD 40 S(0)=0:S(1)=1+4+16+64:S(2)=2+8+32+1
   28:S(3)=255
HA 50 OPEN #2,8,0,"P:"
YL 60 FOR K=1 TO 240 STEP 4
EE 70 BYT1=S(INT(4*RND(0)))
EM 80 BYT2=S(INT(4*RND(0)))
RH 90 FOR J=0 TO 3:I=J+K
FA 100 P1$(I)=CHR$(BYT1)
GC 110 P2$(I)=CHR$(BYT2)
GF 120 NEXT J
GR 130 NEXT K
UJ 140 FOR K=1 TO 16
PV 150 ? #2;CHR$(27);"X";CHR$(80);P1$;
RE 160 ? #2;CHR$(27);"X";CHR$(80);P2$;
GZ 170 NEXT K
RQ 180 GOTO 60
```


WUN public domain disk news

Type GO ANTIC when you log onto CompuServe in September. ANTIC ONLINE will have the details of what's available on the new high-quality public domain disk series being brought out by the Worldwide Users Network.

This is the time when Atari Corp. and third-party developers are rushing to bring out their full line of 1986 products early enough for Christmas distribution. Look to ANTIC ONLINE for the latest news about what new products are going to be on the shelves.

If you're not a CompuServe subscriber yet, see your local computer dealer or phone (800) 848-8199 for information about signing up. Ohio residents phone (614) 457-0802. There is no extra charge for accessing ANTIC ONLINE.

HELP continued on page 109

Antic welcomes your feedback, but we regret that the large volume of mail and online messages makes it impossible for the Editors to reply to everyone. Although we do respond to as much reader correspondence as time permits, our highest priority must be to publish (and upload) I/O answers to questions that are meaningful to a substantial number of readers and online subscribers.

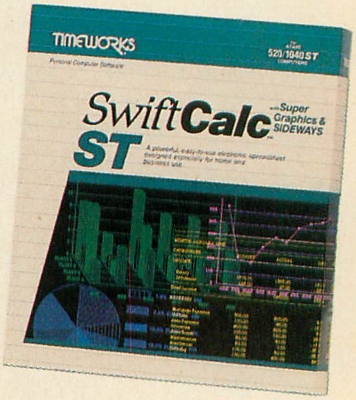
Send letters to: Antic I/O Board, 524 Second Street, San Francisco, CA 94107. *ANTIC ONLINE has an I/O section for email to the Editors only—online queries about Antic products should be uploaded to the Customer Service I/O section of ANTIC ONLINE.*

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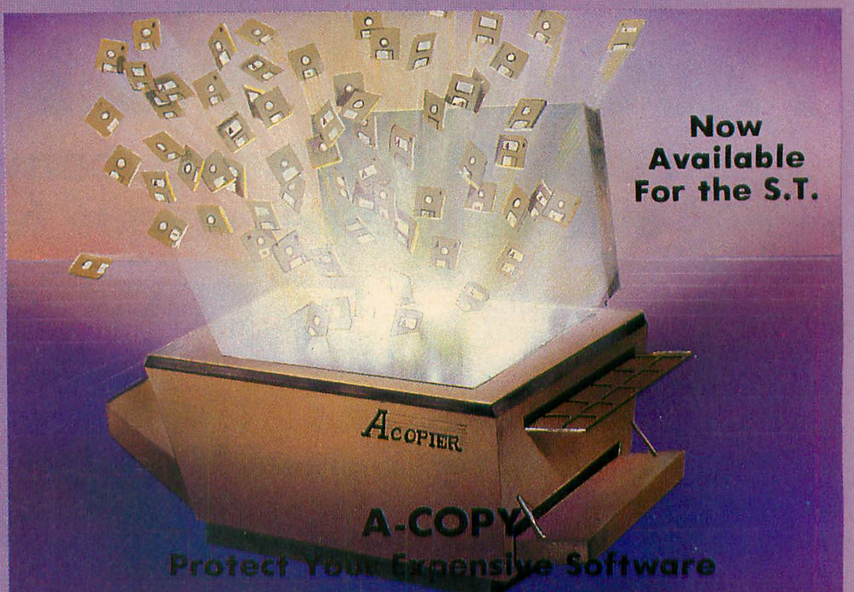
This package is an extremely powerful GEM based mouse driven data base and report writer. The business applications are endless. It has 24 fields, disk based for unlimited number of records, and the ability to do dollar and decimal point calculations. Standard ASCII D-Base and other data base files can be used. The Report Writer can be used for any custom forms like invoices, labels, C.O.D. tags, visa slips, statements and inventory reports, to name a few. It's easy... just grab the field with your mouse, put it where you want it and...click! That is where it will appear on the forms you print.

A-MAILER ST $49.95

At last a *Mailing* Labeling program that is not only super powerful, but also Mouse driven and easy to use. This program is NOT Ram based so you can have as many records as your disk drive can hold. One of the many powerful features includes the ability to insert into a field text that was a prior record just by hitting the TAB key. Other features include 9 fields, labels for 1, 2, 3 across, ability to custom size your labels and port over D-Base or other standard ASCII mail lists. This program also integrates with the Graphic Label Maker.

GRAPHIC LABEL MAKER ST $39.95

This package will allow you to use graphics when printing your address labels. It even gives you different typestyles. This program will interface with both the A-Mailer and XXXXX Rated Graphic Data Disk for those unusual labels.



A-Copy is an easy to use backup program for your Atari ST. A-Copy copys even your protected programs fast and easy. MegaSoft will be updating this program as often as it is needed to keep A-Copy the best copy program available for the Atari ST. Updates may be requested at any time to registered owners of A-Copy **for only $15.00** plus $3.00 for shipping & handling.

Utilities available for other systems include Keymaster and ToolBox 64/128 for the Commodore 64/128. A-Copy and Amiga Tools for the Amiga.

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ST Tools is a complete utility package for the ST. This package is completely GEM based and mouse driven. ST Tools will allow you to do just about anything with the ATARI DISK DRIVE. Some of the options included in this program are: COPY, MOVE, EDIT, RENAME, COMPARE, UNERASE, ERASE, CHANGE STATUS, CHANGE LABEL, FORMAT, and RECOVER ERRORS. Also included are hard drive utilities.

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OCTOBER

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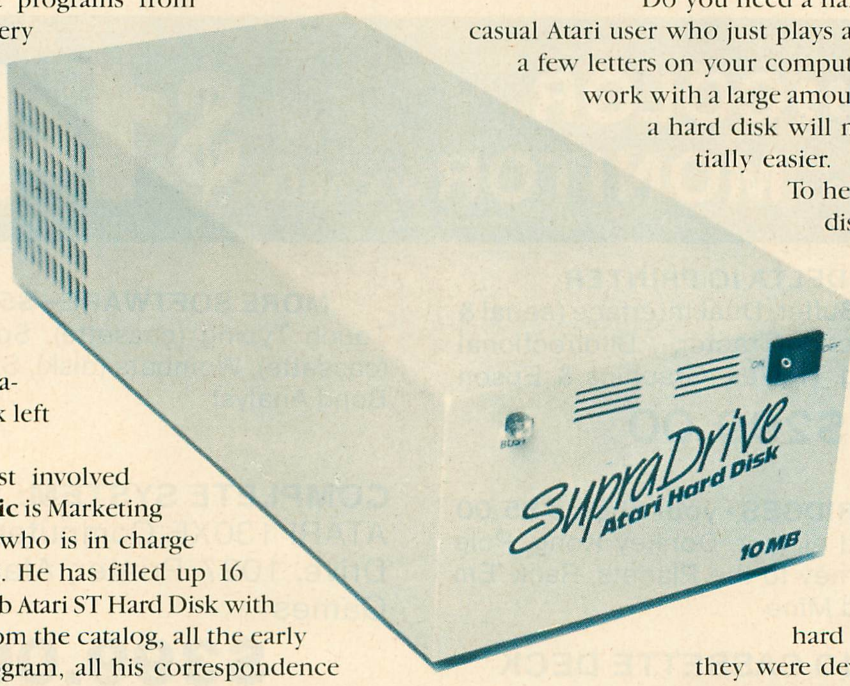
Why you'll want one!

BY NAT FRIEDLAND, ANTIC EDITOR

In recent weeks, gray metal objects the size of shoeboxes have appeared at **Antic** workstations and dramatically enhanced the way we use our Atari 8-bit and ST computers.

These deceptively blank-looking metal shoeboxes are, of course, hard disks—peripherals that open up a whole new world of power, speed and convenience for the serious Atari user.

For example, it's now a lot easier for the **Antic** Technical Staff to answer readers' I/O questions about programs from our early issues. Every 8-bit program ever published in the magazine is stored on our Supra-Drive 8-bit hard disk and can be immediately accessed by a few keystrokes. And we still have almost seven million bytes of the 10-megabyte (10Mb) hard disk left to work with.



Probably the most involved hard disk user at **Antic** is Marketing Director Gary Yost, who is in charge of the Antic Catalog. He has filled up 16 megabytes of his 20Mb Atari ST Hard Disk with every ST program from the catalog, all the early versions of each program, all his correspondence with the software authors and all the Tim Oren ANTIC ONLINE professional ST programming articles. Gary clicks his mouse through onscreen arrays of folders, files and menus with virtuoso speed.

So far, the most widespread use of hard disks by **Antic** readers seems to be for operating bulletin boards. Supra says that the bulk of their sales of 8-bit SupraDrives is to BBS sysops. It's clear that hard disks are the ideal tool for sysops to make their large data libraries quickly accessible to online users.

Among the other early major purchasers are professional Atari software developers, who can compile their code a lot more quickly on hard disks. Power users who run businesses with Ataris or do a lot of work at home are also early hard disk enthusiasts.

Do you need a hard disk? Not if you're a casual Atari user who just plays a few games and writes a few letters on your computer. But if you regularly work with a large amount of data in many files, a hard disk will make your life substantially easier.

To help you decide if a hard disk is for you, the following articles provide a detailed comparison of all hard disks available for Atari 8-bits and STs at this writing. You will get a good idea of what it's like to do your daily computing with a hard disk system. Other stories explain how hard disks work and how they were developed.

Sure, it can be aggravating to learn a new set of computing habits in order to operate a hard disk system. But so far, we haven't heard of many new hard disk owners who are eager to go back to using floppy disks exclusively.

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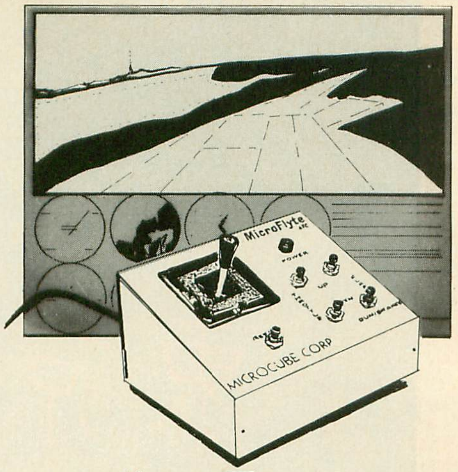
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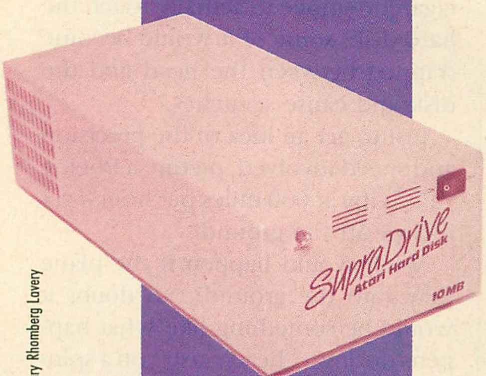
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INSIDE A HARD DISK

"Like flying a Boeing 747 six inches above the ground"

BY PATRICK BASS, ANTIC ST PROGRAM EDITOR



Mary Rhomberg Lavery

Unlike floppy disks, a single hard disk can scan millions of bytes of information in seconds. While floppy disks and hard disks essentially do the same job—storing information—the hard disk goes about it in a completely different way.

FLOPPY VS. HARD

A floppy disk is much like a thin, limp phonograph record covered with the same kind of material as recording tape. To read and write information to a floppy disk, a read/write (R/W) head is lowered onto the disk surface while it spins. Because the head physically touches the disk, friction becomes a factor in determining how fast we can spin the disk—and thus how fast we can access its information. Floppy disks typically spin at about 300 revolutions per minute (rpm).

A hard disk is another creature entirely. To start with, as the name implies, we have a hard disk on which to store information, as opposed to a floppy disk in a stiff paper cover. Typically the hard disk is an aluminum platter covered with a very thin coating of magnetic recording material. It also spins much faster, with some drives rotating as fast as 3,600 rpm. For a 5-1/4-inch disk, this is roughly 56 miles per hour. By comparison, a 12-inch phonograph record spinning at 33-1/3 rpm travels 1.9 miles per hour.

HARD DISKS FOR ATARI

This is much too fast for the R/W head to touch the disk. Friction would soon burn up the entire drive mechanism. Therefore, the hard disk's R/W head *cannot* be allowed touch the disk at all. And here's how the head reads and writes to the disk without touching it.

GAS & MAGNETISM

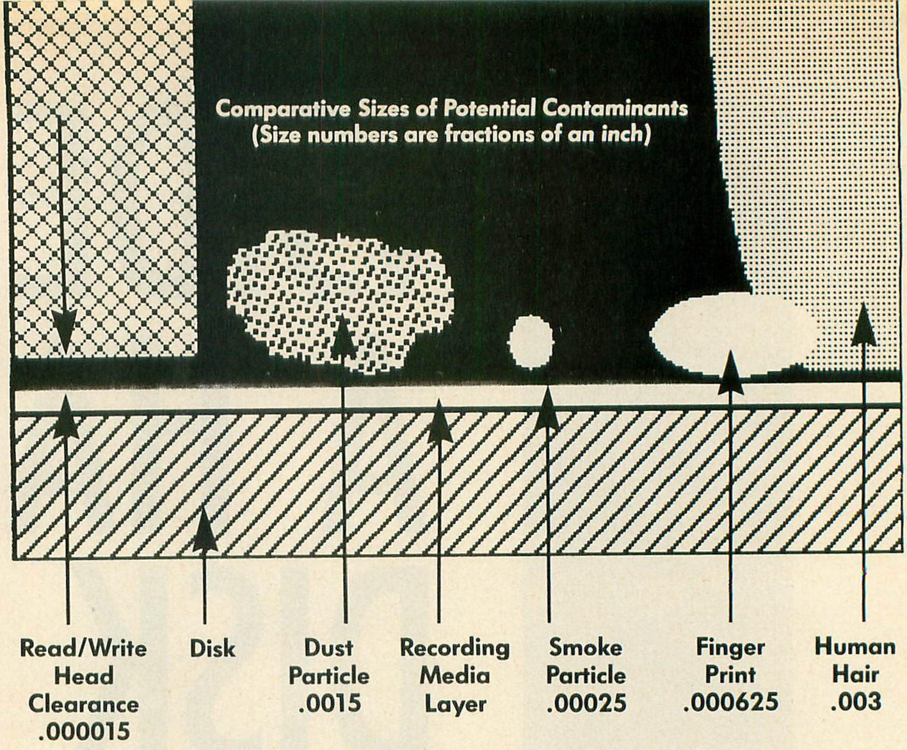
Most hard disks function inside com-

continued on next page

pletely sealed cases that are filled with inert gas. A few hard disks "breathe" by drawing in air and filtering it, then exhausting the spent air.

When a physical object moves through a gas, some of that gas "sticks" to the object and moves along with it. As the hard disk spins, it sets up a very thin layer of gas that spins with it along the face of the disk. The R/W head in a hard disk drive is manufactured to take advantage of this thin layer of gas trapped right next to the spinning disk. The gas gets stuck in front of the R/W head and some of it is channeled underneath the head, forcing the head to "fly" above the surface of the hard disk.

Information is stored on disks as magnetic patterns. And as you move away from a magnet, the strength of the magnetic field falls very quickly. There are electronic formulas that precisely predict this drop-off. So although the hard disk R/W head can't touch the disk itself, in order to store and retrieve information reliably we must place the head as close to the disk as possible.



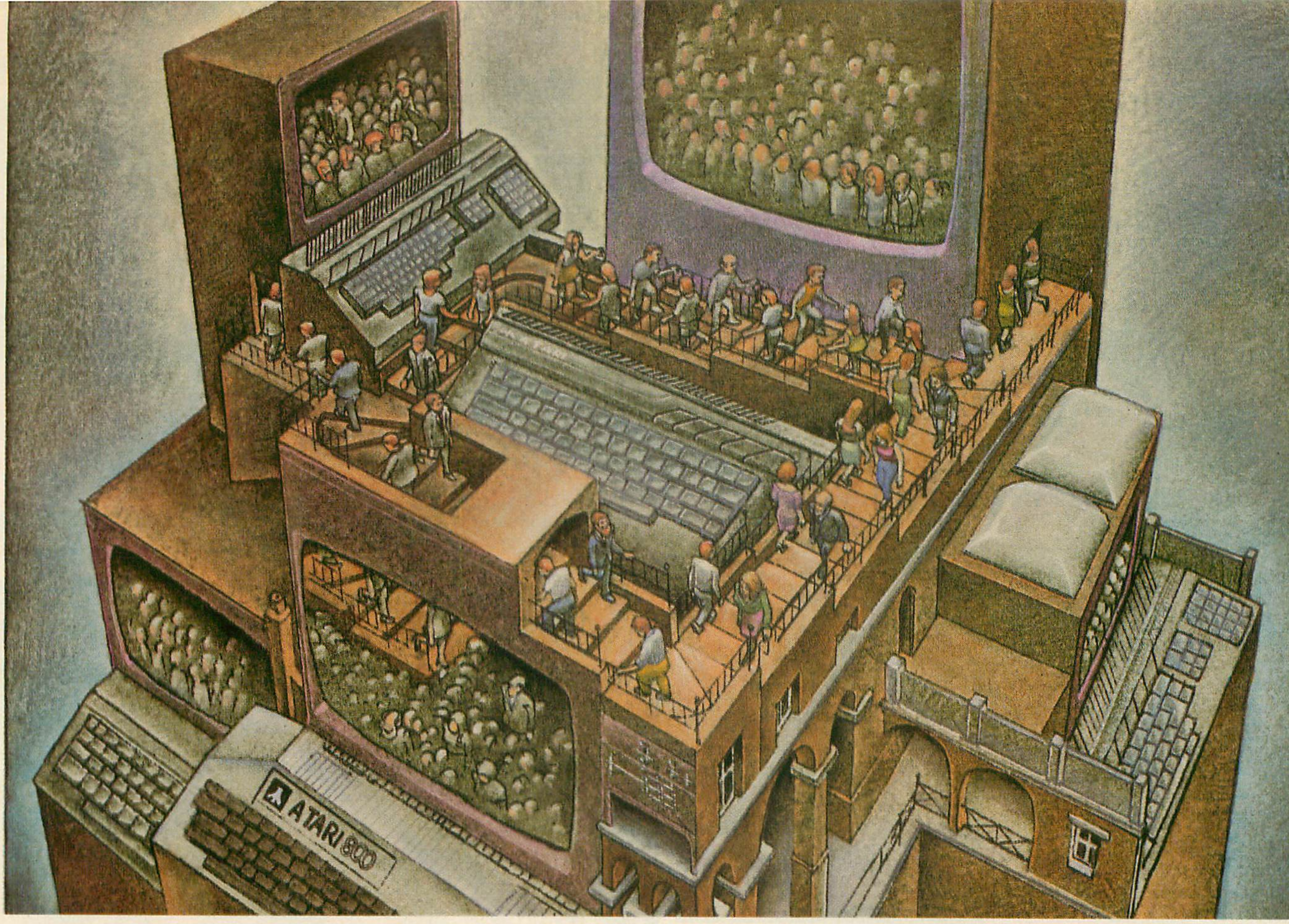
The distance between the head and hard disk is so microscopic that virtually any object is larger. For example, no doubt you sometimes have needed to blow away a stray hair from the surface of a floppy disk. But if the distance between the hard disk and the R/W head was scaled *up* to one inch, the diameter of a typical human hair would be over 16 feet!

Maybe while you removed the stray hair, you even blew cigarette smoke on the disk. At this scale, the smoke particles would range from a half inch to six inches across. If we allowed the cigarette smoke to actually touch the hard disk, some of it would become trapped between the head and the disk and cause scratches.

Just to get an idea of the precision and speed involved, picture a Boeing 747 flying at 600 miles per hour—six inches off the ground!

What would happen if the plane flew into the ground? No doubt it would be something like what happens during a "head crash" on a spinning hard disk. If for any reason the head touches the surface of the spinning disk while in operation, data will almost surely be destroyed from friction heat, which scrambles magnetism. In fact, the crash might be so violent that a physical scratch is gouged out of the disk surface. This renders the disk unusable and will cost mucho dollars to repair.

Therefore, any hard disk user should keep two things firmly in mind. First, treat your drive *very* gently and keep the head in lock position when you're not operating the disk. And second, make a floppy disk back-up of *every* hard disk file you wouldn't want to lose.


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BY JESS ENGELHART

TEXT SIDEWINDER

Eye-catching horizontal display

Text Sidewinder displays your text as a horizontal banner flowing across the screen. You can use it as a stand-alone or insert it into your own programs. This short BASIC program works on all 8-bit Atari computers of any memory size, with disk or cassette.



If you ever wanted to program an eye-catching horizontally scrolling video text display for a user's group booth or in-store use, Text Sidewinder should be just the thing for you. This program floats a multi-colored message across the screen—as much as 2,500 characters long. Experienced BASIC programmers can easily convert Text SideWinder into a subroutine for their own larger programs.

The SideWinder display can be in either Graphics 0 for standard-size characters, Graphics 1 for double-sized characters, or Graphics 2 for even larger characters. The program takes your message—entered as DATA statements at the bottom of your program—and places it into a long character string, which it then slides across your screen.

USING THE PROGRAM

Type in Listing 1, SCROLLER.BAS, check it with TYPO II and SAVE a copy before you RUN it.

The banner's speed is displayed in a window on the screen. Lines 50 to 60 contain the timing loop that controls this speed. Pressing the Spacebar gradually cycles the banner speed to a peak of 10 and then resets it back to 150. If a steady speed is what you want, delete lines 55-60 and change line 50 to:

```
50 FOR R=0 to TIME:NEXT R:RETURN.
```

In line 630, "TIME=150" can be varied to change the default speed setting. The routine which displays the banner is in lines 1000 to 1020.

DATA statement lines 4000 to 4010 contain your message. If you follow the rules below, you can type in your own words and change the colors.

In Graphics 1 or 2, upper case letters (capitals) in the DATA statements show up orange, and lower case becomes green. Upper case/inverse is blue and lower case/inverse becomes pink. These are the default color settings in those graphics modes. To experiment with different colors, try typing commands such as SETCOLOR 2,3,4. (*For the SETCOLOR chart showing all 128 available default colors in the graphics modes, see Chapter 8 of Lon Poole's book, **Your Atari Computer**, $17.95 from Osborne/McGraw-Hill, Berkeley.*—ANTIC ED)

No commas should be used to separate text in the DATA statements. In order to show up properly on the screen, words should be split at the end of each DATA statement. Spaces cannot be added at the beginning or end of DATA statements. To understand this format better, observe how the sample text is handled in lines 4000-4010.

Jess Engelhart lives in London, Ontario, and is currently working on a communications program for the handicapped, featuring the Covox Voice Master.

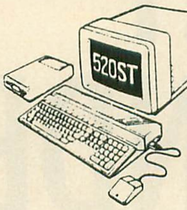
Listing on page 90

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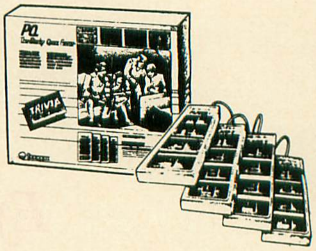


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YOU MEAN I CAN CHANGE THE PROGRAMS?

Yes, the Modem Operating Environment eliminates the need to perform modem operations. The bulletin board is written in understandable BASIC and is, in fact, designed with modification in mind. The Carina BBS is also module based. This means you are no longer restricted by the memory of your computer, but rather by the amount of on-line storage on your disk drives and your ramdisk. The Carina BBS itself is not 1 but 7 separate programs. It is a massive system that can be expanded beyond your imagination.

WHAT PROGRAMS COME WITH IT?

The modules included are: The waitcall module which performs user logon/logoff functions, the bulletin board itself which controls all message bases and databases, the file-transfer module with X-Modem upload/download transfer protocol, the message editor (with extensive word processor-like functions), the SysOp commands with the most powerful functions available for any bulletin board on-line, the sub-commands module which contains miscellaneous extra functions, and an on-line trivia game. The Carina BBS has a total of 44 commands including 17 SysOp functions. It is easy to add any other modules of your own, plus there is plenty of room to add any other functions in different modules.

DOES THE CARINA BBS USE ONE-LETTER COMMANDS?

No, the Carina BBS uses word commands as opposed to single letters. For example, typing "Read New" will show you all new messages since your last call. If you prefer just typing one letter, that can be done also. Each command has a macro key that will type the words for you. Typing Ctrl-R Ctrl-N will duplicate the above input. You can also stack more than one command on a line. It is more powerful and a lot easier.

WHAT EQUIPMENT DO I NEED?

To run the Carina BBS you will need an Atari 8-bit computer, at least 1 drive, and a modem. A printer can also be used. The Carina BBS will work with most DOS's and many different interfaces and modems. The Carina BBS is known to work with the Atari 850 interface, the ATR 8000, the Hayes Smartmodem, the MPP 1000C/E modems, and the Q-Modem. It also supports 1200 and 2400 baud.

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There really isn't enough room to tell you all that the Carina BBS can do. The best way to find out what it can do is to call 305-793-2975 for an on-line demonstration or write for more information.

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CIRCLE 29 ON READER SERVICE CARD

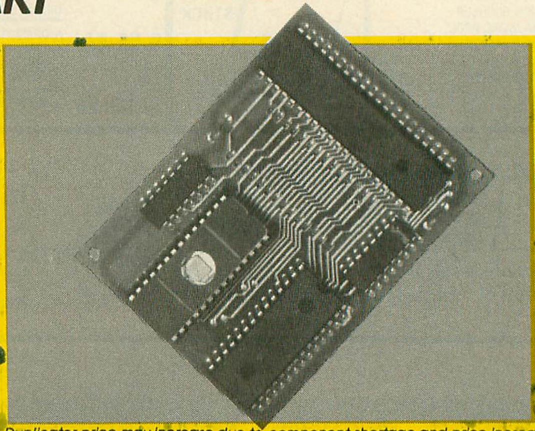
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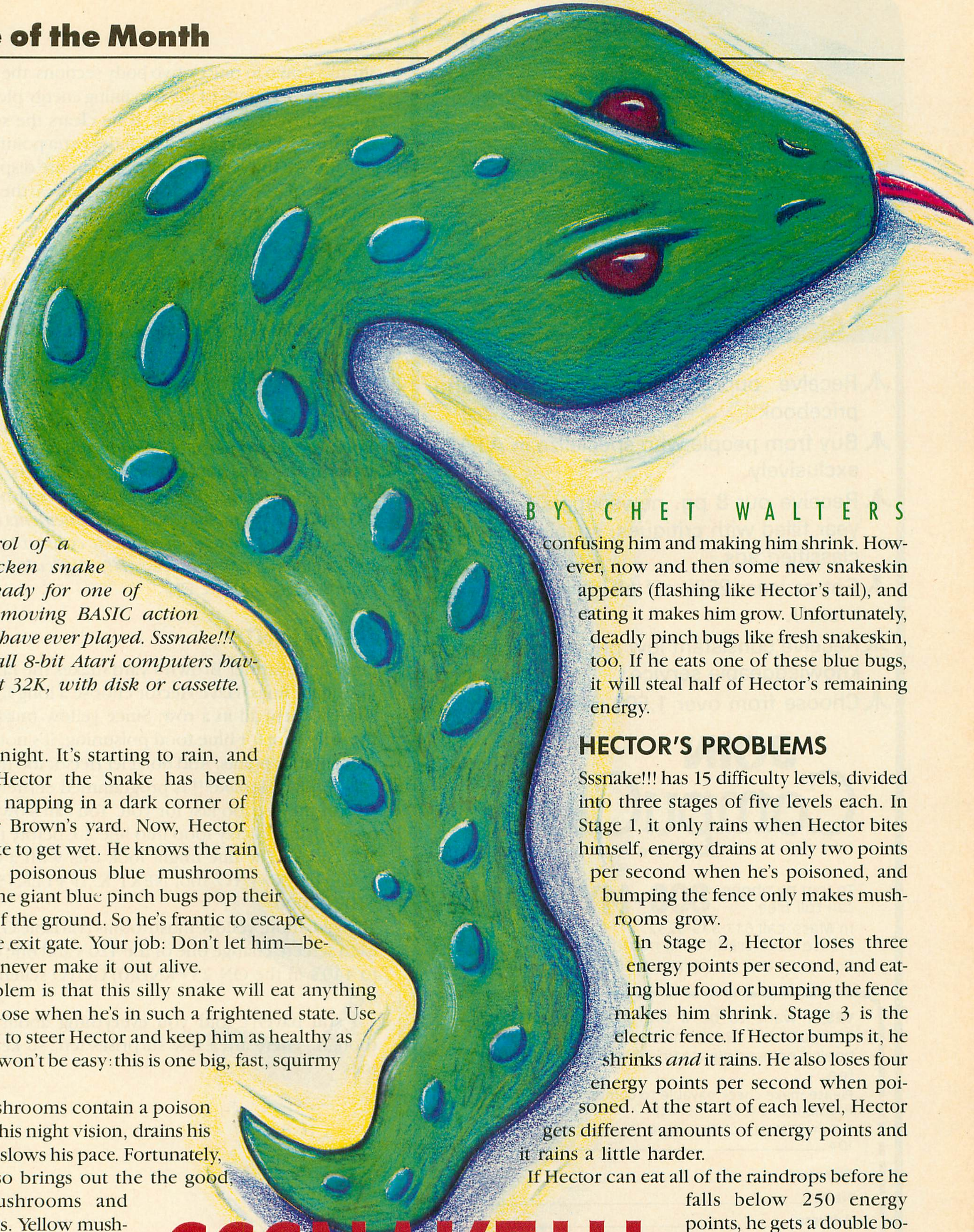
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SSSNAKE!!!

Help a fright-crazed reptile survive

BY CHET WALTERS

Take control of a panic-stricken snake and get ready for one of the fastest-moving BASIC action games you have ever played. Sssnake!!! works on all 8-bit Atari computers having at least 32K, with disk or cassette.

It's midnight. It's starting to rain, and poor Hector the Snake has been caught napping in a dark corner of Farmer Brown's yard. Now, Hector does not like to get wet. He knows the rain makes the poisonous blue mushrooms grow and the giant blue pinch bugs pop their heads out of the ground. So he's frantic to escape through the exit gate. Your job: Don't let him—because he'll never make it out alive.

The problem is that this silly snake will eat anything under his nose when he's in such a frightened state. Use the joystick to steer Hector and keep him as healthy as possible. It won't be easy: this is one big, fast, squirmy snake.

Blue mushrooms contain a poison that affects his night vision, drains his energy and slows his pace. Fortunately, the rain also brings out the the good, yellow mushrooms and glow worms. Yellow mushrooms are the only cure for blue food poisoning.

Oh yes—Hector can stay dry by eating the raindrops. But if Hector carelessly bites himself, more raindrops fall, confusing him and making him shrink. However, now and then some new snakeskin appears (flashing like Hector's tail), and eating it makes him grow. Unfortunately, deadly pinch bugs like fresh snakeskin, too. If he eats one of these blue bugs, it will steal half of Hector's remaining energy.

HECTOR'S PROBLEMS

Sssnake!!! has 15 difficulty levels, divided into three stages of five levels each. In Stage 1, it only rains when Hector bites himself, energy drains at only two points per second when he's poisoned, and bumping the fence only makes mushrooms grow.

In Stage 2, Hector loses three energy points per second, and eating blue food or bumping the fence makes him shrink. Stage 3 is the electric fence. If Hector bumps it, he shrinks *and* it rains. He also loses four energy points per second when poisoned. At the start of each level, Hector gets different amounts of energy points and it rains a little harder.

If Hector can eat all of the raindrops before he falls below 250 energy points, he gets a double bonus. However, if he gets below 50 while raindrops remain, he turns a sickly green and a danger signal sounds. At zero energy, or if Hector

continued on next page

DENIS MORELLA

shrinks down to one or two body sections, the round ends and he gets a bonus of the remaining energy plus ten points for each body section left. If he clears the screen of all raindrops, the reward also includes extra points for all that remains on the screen. Energy points are displayed at the bottom of the screen. Any key pauses the game and [START] will go to the title screen.

TYPING IT IN

Type in Listing 1, SNAKE.BAS, check it with TYPO II and SAVE a copy before you RUN it. BEGINNING PROGRAMMERS: Make sure you type in *every* line—even the REM statements—and *don't* renumber the program. The game won't work unless you type in the listing exactly as published.

(*Please note that Sssnake!!! was written by a professional programmer who used many BASIC "shortcuts" which* **Antic** *does not recommend to readers. These shortcuts include self-modifying routines, program lines that GOTO REM statements and GOTO statements which reference variables instead of numeric constants. The resulting code becomes unnecessarily difficult to trace and troubleshoot.*—ANTIC ED)

SOME HINTS

Erosion in Farmer Brown's yard makes the raindrops fall in straight lines. Have Hector choose a long line of drops and eat them all in a row. Since yellow mushrooms are the *only* cure for blue food poisoning, it's not wise to eat them just for points. And don't let Hector too near the gate.

Although Sssnake!!! is programmed entirely in BASIC, Hector may be too fast for you. You can slow him down by inserting a delay loop into line 20, before the [START] key check. The line might look this with a delay loop:

```
20 FOR X=1 TO 100: NEXT X: IF PEEK (53279)=N6 THEN 2000
```

To make more yellow mushrooms (variable GM) grow on each screen, change one of the 420's and one of the 430's to 440's in the ON 23*RND(0) GOTO statement in line 415.

I still haven't told you everything about the game, though. There are a few surprises left, so keep on your toes.

Chet Walters' Non-Standard Magic company in Girard, Ohio is the publisher of Picture Plus, Lister Plus and Journal Plus. His Amazing Card Shuffler program appeared in the July issue of **Antic**.

Listing on page 91

REVIEWED BY CHARLES JACKSON, ANTIC TECHNICAL EDITOR

SUPRADRIVE FOR 8-BIT ATARIS

10 million bytes at your fingertips

The **SupraDrive** 10 megabyte (10Mb) hard disk for 8-bit Atari computers delivers *fast* access to the equivalent of over 100 floppy disks at the touch of a key. Our **Antic** 10Mb SupraDrive contains every 8-bit program ever published in the magazine—with more than seven megabytes still available for more data.

HARD DISKS FOR ATARI

The system's controller board is encased in a long plastic box, roughly the size of a paperback book, which plugs into the parallel bus port on Atari XL and XE computers. A 50-conductor ribbon cable and a four-conductor power cable (each cable about 30 inches long) connect the controller board to the gray metal SupraDrive, which is approximately the size of a small shoebox and weighs 8-1/2 pounds. The controller board comes with its own parallel bus port so it can be "daisy chained" to other compatible peripherals.

If you own a 130XE, you'll need the $16 XE adaptor that plugs the controller board into the XE's parallel bus port *and* cartridge slot. This adaptor has its own cartridge slot, permitting use of cartridge software with the SupraDrive.

When running, the drive makes a gentle whine. During disk access, it emits a faint "blooping" noise. The system is designed for unmodified Atari XL and XE computers. Custom chips such as RAMrod and Omnimon will *severely* damage the SupraDrive.

USING SUPRADRIVE

The SupraDrive hard disk is divided into two sections, each of which is treated by the Atari as an independent disk. The first section becomes drive 1 and is called the "fake floppy." It has the same capacity as a floppy disk, can be set to either single or double density, and is compatible with any disk operating system (DOS). Normally the computer will boot from this drive.

You'll also need a real floppy disk drive to use the hard disk system. This drive is configured as drive 2 and lets you copy floppy disk files to and from the hard disk.

The second section of the SupraDrive is configured as drive 3 and contains the remainder of the hard disk's storage space. It can be set to either single or double density, but may only be accessed with MYDOS (which is provided with the SupraDrive) or ICD's SpartaDOS. Other operating systems, such as Atari DOS 2.0 and 2.5, cannot access all of the hard disk's sectors.

The SupraDrive comes with a MYDOS 4.0 disk that also contains nine helpful utility programs. There are utilities to write-protect and write-enable the hard disk, which is comparable to placing write-protect tabs over the notches of a floppy disk. Another program controls the flow of linefeeds to your printer. One very important utility "parks" your drive—locks its read/write heads into position above the innermost track of the disk to prevent damage when the drive is being moved. The ACTION! source code for the park program is included in a separate file. The main utility formats your hard disk, then checks it for bad sectors. This process takes between 10 and 20 minutes.

MYDOS organizes disk files into subdirectories. A subdirectory is a disk file which houses other disk files. This arrangement is similar to the Atari ST "folders" that hold multiple files.

SAMPLE SUBDIRECTORY:

Let's assume that you use your Atari and SupraDrive to manage a business. At the end of each day, you generate a sales report and store it on the hard disk. At the end of the week, you can look at the disk file directory and see seven files—one for each day of the week. MYDOS lets you collect these files for storage in a single, larger file.



First look at the forthcoming 20-megabyte SupraDrive for Atari STs. This new 3½ inch hard disk is said to be faster than 5¼ inch hard disk drives, as well as more compact.

Call this file WEEK1.

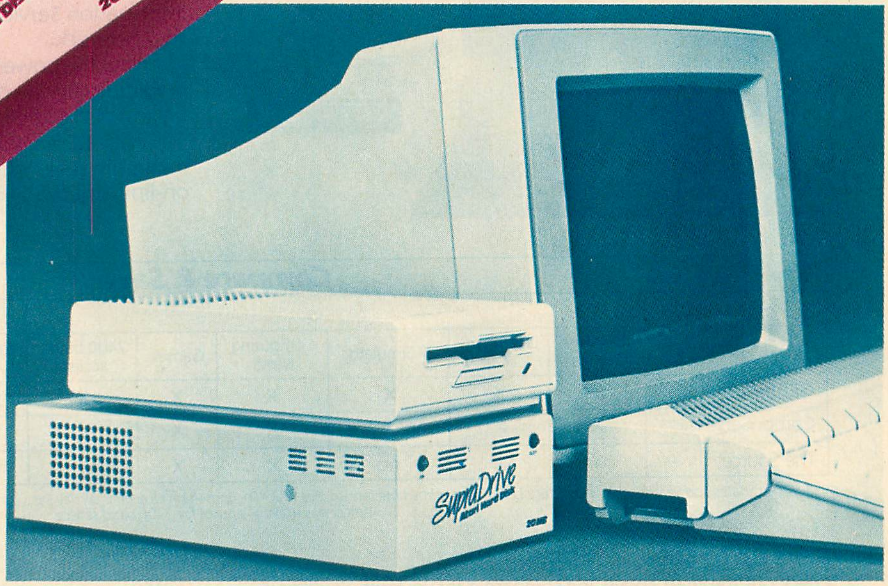
When you examine the main disk directory, you'll only see the WEEK1 file. You must examine the subdirectory of WEEK1 to find your seven original sales reports. You could take this even further by placing all your weekly reports into a monthly report file, and store your monthly report files in a yearly report file, and so on.

Subdirectories don't conserve disk space. But they make it much easier to organize large numbers of files. We've taken every program ever published in **Antic** and stored them on our SupraDrive. The programs are organized into subdirectories according to the month and year they were published. For example, our D3:OCT86 subdirectory contains the CASTLE.BAS and the STRETCH.ACT files. To LOAD the Castle game from BASIC, you'd type:

LOAD "D3:OCT86:CASTLE.BAS"

DRAWBACKS

A hard disk drive is a uniquely powerful tool for a bulletin board sysop or a professional programmer. But it can be an overpriced headache to the casual user. The hard disk is designed to take over booting up your system. If you want to use a professional program that's not stored on your disk, such as a word processor or a game, press the [HELP] key and the computer will boot from the floppy disk drive (drive 2). Programs designed to be used exclusively in drive 1, as well as programs which do not "get along" with your hard disk system, will not function properly. In this case, you must turn off your hard disk system, unplug the controller board from your computer, and reconfigure your floppy drive to be drive 1.



If you have two floppy drives, the procedure is a bit easier. The floppy drives should be configured as drive 1 and 2. When you're using your hard disk system, turn off floppy drive 1. To disable the hard drive system, turn it off and remove the controller board from your Atari. Now, turn on both floppy drives, and your professional software disks will function normally.

CARE AND FEEDING

As with any hard disk system, you should *never* move or jar the SupraDrive while it's running. Be sure to keep it on a stable surface, where it's not likely to be tipped over. At **Antic**, we keep our hard drives on our desks. The technicians at Supra Corporation prefer to leave theirs on the floor.

Whenever you must move your hard disk drive—even a few inches—you should first *park* it (using the software as described above) and turn off the power switch. When you re-boot your hard disk, it will automatically unpark itself. It's also a good idea to park your drive whenever you're not going to be using it for any length of time.

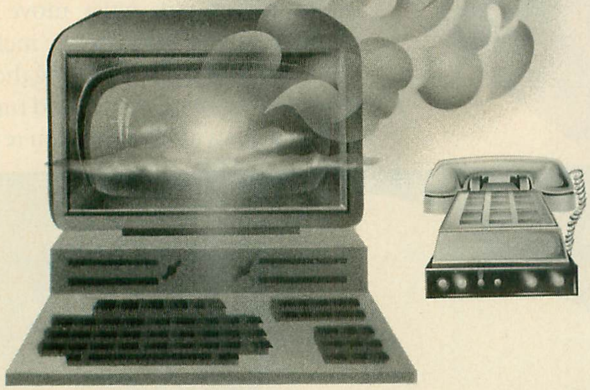
Finally, even the finest of hard drives can occasionally malfunction. *Always back up your files on floppy disks.* Despite the name, hard disks are fragile. And a moment of carelessness could destroy months of work if your files are not backed up.

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CIRCLE 050 ON READER SERVICE CARD

BY PATRICK BASS, ANTIC ST PROGRAM EDITOR

Part I:

THE GREAT GOTO DEBATE

Never use a GOTO



(The following pro-and-con debate replaces Contributing Editor Dave Plotkin's New Owners Column for this month only. The GOTO lesson submitted by Plotkin aroused such controversy among the technical staff of Antic Publishing that we decided to instead print an in-depth debate about all the reasons for using or avoiding the GOTO command. Frank Hayes, of ***Antic's*** *sister publication covering Apple IIs, takes on ST Program Editor Patrick Bass.*

Not every concept in these two articles has already been covered in the first six New Owners Columns. Any unexplained details will be covered in future lessons. But we feel that this debate on seemingly conflicting philosophies of programming contains valuable ideas for all beginning and intermediate programmers. And you'll notice that despite some different opinions, Bass and Hayes agree that the most important thing is for programs to be clean, clear and understandable.—ANTIC ED)

GOTO is a BASIC language command that *unconditionally* transfers program execution from one line to another—anywhere else in the program. An example would be: 100 GOTO 850. When the computer tries to execute line 100, control is transferred to line 850, if there is one. . .

After bitter experience, I don't use GOTOs in my own programming. In fact, I believe that if a program has any GOTOs at all, there's a mistake in logic somewhere. I get a lot of "good-natured" flak at the office about this.

I admit I occasionally GOTO in short BASIC programs which will



only exist briefly—but *never* when I know the code will be read and possibly changed by other programmers. Here's why:

None of us is perfect, so we make mistakes. And other people cannot read our minds. This is an important point, because computer programs are nothing more than the *crystallization* of the programmer's thought processes saved on disk.

Think about that for a second. It is the programmer who must break each task down into its various parts and then select the appropriate machine instructions which appear to accomplish the job.

One of the beautiful aspects of programming computers is that for any problem, there are *at least* as many solutions as there are programmers working on it. An answer that seems perfectly clear to you could stop other programmers dead in their tracks. There must be some way to group instructions together so that someone else can follow the original programmer's thoughts without undue confusion.

FROM THE GROUND UP

When a person starts learning to program, the GOTO is a GODSEND. It will take you anywhere in no time flat (even deep into trouble). But the first few programs a person writes are not likely to be too large, probably less than 100 lines of code. Any reasonably well-organized beginner can keep in their head the entire logic flow of a program this size.

Aside from the risk of slipping into messy logic or doing stupid things like GOTOing out of the middle of a subroutine so many times that the memory stack overflows (see last month's *New Owners Column*), there are no real reasons not to use a GOTO. After all, GOTOs do work, they are

continued on next page

available and they do keep the program shorter.

But as budding programmers become more confident in their ability, the size of their programs slowly increase. Until one night while tracking down one of the many "bugs" which always seem to inhabit their programs, they realize they've lost control of the overall logic. This seems to happen at around 250-500 lines of code.

Indeed, this was one of my own biggest stumbling blocks. There I was, locked away inside my little room wondering how in the world someone put together a program 2,000, 5,000, even 10,000 lines long. In my naivete, I thought these professional programmers had some form of Holy Grail they could turn to for keeping the code straight in their minds. I was wrong.

Enlightenment came when I visualized a connection between "building" a house and "building" a program. A house is built of many small nails and boards, each of which by itself contributes little to the overall building. In the same way a program is built up of many small instructions which, taken by themselves, contribute little.

Nobody expects contractors to remember each and every nail and board they build a house with, or to remember the dimensions of the south wall in the third hall on the second floor. But contractors work from *written plans* and I found out that it is possible for programmers to work from written plans also.

STRUCTURE INTRODUCTION

These plans are the basis of Structured Programming, which itself takes advantage of the fact that any program, or rather any *sequence of instructions*, can be built up in groups of only three different "structures."

These three structures are:

1. A simple **sequence** of instructions. BASIC, for example, will start program execution at the lowest line number, then proceed to the next higher line number, then the next higher and so forth, unless told to do otherwise.

2. A **conditional branch** structure where execution of a sequence of instructions depends on a true or false condition. In BASIC this is represented by the IF/THEN structure.

3. A **loop** structure where a sequence of instructions is repeated as long as some specified condition remains true. In BASIC, this is represented by the FOR/NEXT verb structure.

However, notice that nowhere above did we mention **unconditional branches**—or more simply, the GOTO. Why? Because we don't need it.

STRUCTURE ADVANTAGES

Greater minds than yours or mine have proven that with only the above three structures, any program of any size may be built—with each task in its own block of code. The program itself can be taken as a structure that encompasses a whole collection of structures, each of which is built up of smaller structures and so forth.

This makes the overall sequence of operation easy to follow. Each individual section of the program may be tested and debugged individually as the program develops, and once running they need not be examined again. Indeed, they may be treated as "black boxes," which do a single job and nothing else.

Each related group of structures may be grouped together to form a larger black box that does a somewhat larger job. For example, we can write separate routines to get a filename, open a file, write the file and then close the file. But then we can group these routines together into a single, "Write a file to disk" structure.

A Structured Program is somewhat self-documenting and, when properly written, should almost explain itself completely. It should be as easy to read as a short story, with the structures acting as the "outline" of the program.

But remember, I'm **not** promising you a Rose Garden.

STRUCTURE DISADVANTAGES

To properly write a program in a structured form, you need to use a somewhat high-level language which allows the formation and use of the three structures. Working in machine language, for example, it is possible to construct the three different structures. But they may not be completely visible to the casual reader. A person needs to GOTO (sorry) a higher language such as BASIC, Pascal, or C before these structures jump out at the reader.

By limiting yourself to only three structures, some programs can be downright awkward to write. They also might execute more slowly and consume more memory than a program which doesn't follow these rules.

Lastly, most programmers do not start out learning to program in a structured environment. The need for structure does not become evident until the programmer acquires enough skill to write fairly long programs. And human beings tend to resist learning new methods.

STRUCTURE REVIEW

Overall, programming in a structured environment forces disipline on your program design. It forces the programmer to think in terms of individual sections of code having only a single entrance and a single exit, sections which can be individually checked for logical accuracy.

So use the GOTO if you desire, but be warned that eventually you'll get into trouble. For small programs the difference will be small. But as your programs grow, you may find yourself wasting hours to track down bugs directly related to the actions behind a forgotten unconditional branch. Believe me, it's not worth the programming time you save by using an unconditional GOTO.

And please, if you ever expect other persons to read your programs, take pity on them, for you know they aren't as smart as you.

BY FRANK HAYES, II COMPUTING ASSISTANT EDITOR

THE GREAT GOTO DEBATE

Part II: Sometimes GOTOS are best



Here are two of my favorite myths about using the GOTO command in BASIC:

1. There's nothing wrong with GOTO. Use it whenever you like!
2. There's nothing right with GOTO. Don't use it—ever!

One crowd believes that a GOTO is a very convenient way of getting from one place in a program to another, and that you can safely use it throughout any BASIC program. Actually, it isn't —and you can't.

Another group—mostly enthusiasts of Pascal and other "highly structured" languages—insists that the GOTO is to be hated and feared, that it destroys programs and damages programmers' minds, and that it should never be used under any circumstances anywhere.

Why do people develop such an extreme love or loathing of GOTOs? I suspect it mainly has to do with a fundamental misunderstanding of what a GOTO is, what it means, and how it should be used—and the misunderstanding is tied to some mistaken ideas about programming in general.

BRANCHABLE BASIC

BASIC's GOTO statement is a simple branching statement—a way of changing the flow of a program. Every programming language has ways of changing the program flow, and very few programs of any length follow a simple linear path from beginning to end. In fact, the reason we design computer programs is to tell the computer when and how to make decisions based on the available data, and change program flow accordingly.

Every microprocessor has branching capability built into it—and every programmer regularly uses branching, even in assembly language. The only difference is that some branching is obvious and some is hidden.

Aside from risking messy logic, there's no real reason not to use GOTOs

FOR/NEXT LOOPS

A good example of hidden branching in BASIC is the FOR/NEXT construction. Actually, in most versions of BASIC it's the only example of a hidden GOTO.

This is how FOR/NEXT works:

```
10  FOR A=1 TO 10
20  PRINT "HELLO"
30  NEXT A
```

It is simply a variation of:

```
10  LET A=1
20  PRINT "HELLO"
30  LET A=A+1
40  IF A<=10 THEN GOTO 20
```

How is the first version better than the second? One way is obvious — the version using FOR/NEXT takes fewer statements. But there are two more important factors. The first is that the FOR/NEXT construction always automatically remembers where it should branch to. Suppose you added a line 15 to each of the two short routines above:

```
15  PRINT A
```

In the version with FOR/NEXT, the program automatically knows to branch up to line 15 when it repeats the loop. Without FOR/NEXT, you'll also have to change line 40, so that the program will GOTO line 15 instead of 20.

The second critical factor is that the FOR/NEXT loop makes it much clearer what's going on. It's obviously a loop—and it's clear where the loop begins and ends, and what will make it stop looping.

That's the real reason FOR/NEXT is better than GOTO for a loop like this —it makes the program clearer, cleaner, and more straightforward.

Some programming languages have many different kinds of loop structures. BASIC typically has just the FOR/NEXT loop, but it's easy to build other looping structures in BASIC — DO loops and WHILE loops and UNTIL loops— using IF/THEN and GOTO statements. It's easily the most effective use you can make of GOTO, as long as you make *clear* exactly what you're doing.

IF/THEN GOTO

FOR/NEXT is clearly better than GOTO for at least some loops. Why not use it for all loops? After all, that would get rid of all GOTOs and also help make a program's structure clear—wouldn't it?

Unfortunately, no. When you try to twist FOR/NEXT around so that it acts as a general purpose loop, it generally creates more problems than it solves.

A typical way of using FOR/NEXT as a general purpose loop is to set the STEP to 0—for example:

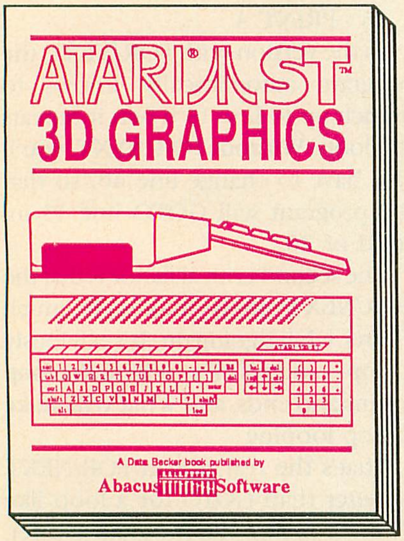
```
10  FOR A=1 TO 2 STEP 0
20  INPUT A$
30  IF A$="X" THEN A=2
40  NEXT A
```

In this example, because of the

continued on page 49

REQUIRED READING

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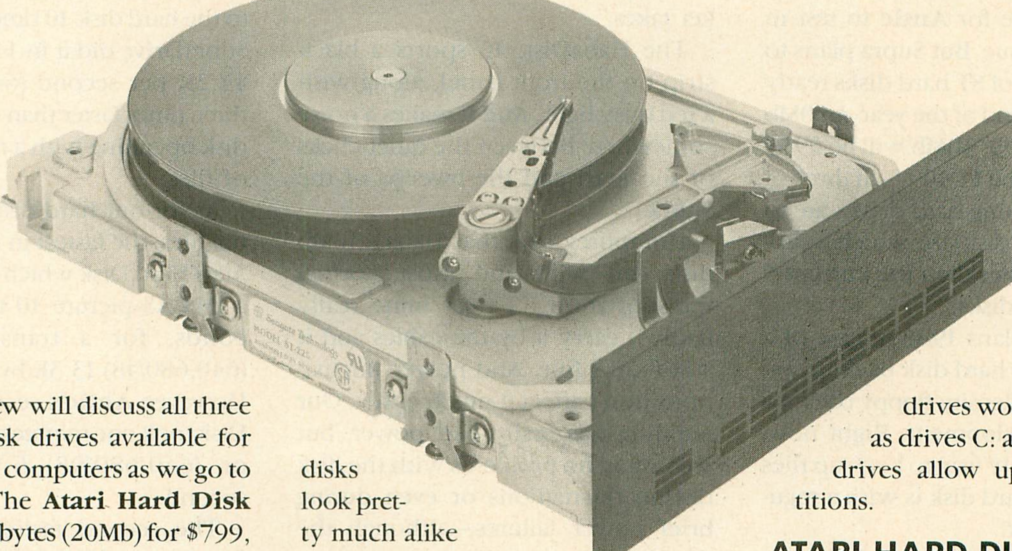
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CIRCLE 002 ON READER SERVICE CARD

BY PATRICK BASS, ANTIC ST PROGRAM EDITOR

THREE HARD DISKS FOR THE ST

Atari 20Mb, SupraDrive and HabaDisk 10Mb



THIS PHOTO AND COVER DISK DRIVE COURTESY OF SEAGATE TECHNOLOGY.

This review will discuss all three hard disk drives available for Atari ST computers as we go to press. The **Atari Hard Disk** offers 20 megabytes (20Mb) for $799, the **SupraDrive** ($549) and the **HabaDisk 10** ($599) are both 10Mb hard disks. Today at **Antic** ST workstations, you can find two Atari Hard Disks, two SupraDrives and one HabaDisk. These power-packed peripherals have already proven themselves reliable and virtually indispensible in our office.

HARD DISKS FOR ATARI

FIRST IMPRESSIONS

Physically, all three 5 1/4 inch hard disks look pretty much alike—gray metal cases about the size of small shoeboxes, with cooling fans and cables in the rear. **Antic** had to use two of these hard disks with annoyingly short 10-inch cables connecting to the ST. But the manufacturers say that the final marketed versions will have handier 18-inch cables—so you won't need to set up the hard disk sideways to your ST.

All three hard disks install themselves as drive C:. However, when you format the disk you have the option of "partitioning" the drives into two or more logical drives, each with its own drive letter. For example, a single drive partitioned into two logical drives would be accessed as drives C: and D:. All three drives allow up to four partitions.

ATARI HARD DISK

At $799 for 20 million bytes of information storage, the Atari hard disk clearly delivers more "power without the price" than its competitors. However, if rock-bottom cost is more important to you than an additional 10Mb capacity, the Supra or Haba should suit you very well.

At this writing, Atari Hard Disks were just beginning to show up in the stores. **Antic** owns the slightly plainer developer's version, which had previously been sold directly by Atari in limited quantities. Our Atari Hard Disks are almost featureless in front, with the only visible object a red busy

continued on next page

light that glows whenever the drive is accessed.

The light is a good idea, because this drive is the quietest hard disk in the office. No more than a tiny "ca-click, ca-click" noise can be heard above the *very* quiet Atari fan when the hard disk is busy reading or writing.

As with most hard disk systems on the market, the Atari Hard Disk is largely packaged from existing components—rather than being manufactured from scratch. Generally only the interface circuit board is actually an original design from the packager. According to Atari, their hard disk system includes the highly regarded Seagate ST225 drive mechanism and Adaptek controller.

SUPRADRIVE

Supra's 10Mb hard disk was their only model available for **Antic** to test in time for this issue. But Supra plans to have a full line of ST hard disks ready for sale by the end of the year. A 20Mb disk will be $799, 30Mb will be $999 and 60Mb will be $1,999—all three of these forthcoming hard drives are to be in 3 1/2 inch disk size, which is supposed to be faster than the current 5 1/4 inch hard disks.

Supra also plans 1986 release of a streaming-tape hard disk backup system, and high-density floppy backups are under development. Right now, though, the only way to back up files from any ST hard disk is with a regular floppy disk.

The SupraDrive hard disk has script lettering on the front, along with an illuminated power switch and a red busy light. While this drive isn't as quiet as the Atari, the Supra's "bweep-bweep" sounds are reassuring. At least you can hear that the drive is working.

Supra technician Willie Brown describes the SupraDrive hard disks as sensitive, but not fragile. "Slow movement while it's on won't hurt it, but abrupt movement can kill it. If you knock it a good rap while it's running, it could be bye-bye baby. But when my 20-megger isn't running, I throw it in my briefcase. Also, fluctuation in power won't affect it much. The power supply can usually fall under 90 volts without dropout."

Brown says that Supra's hard disks for the Atari 8-bit computers are bought mostly by bulletin board operators—in fact, this is the huge majority. ST hard disks are bought by serious software developers, bulletin board operators and people who do a great deal of work at home.

HABADISK 10

Costing between $599 and $699 retail, the HabaDisk 10 is Haba's only hard disk and it works with only the ST. Gerry Humphrey, ST product development manager at Haba Systems Inc., says, "The HabaDisk 10 is in limited production now because of the 20-meg disks from Supra and Atari. We're not discontinuing our hard disk, but we're not going all out until we see what direction the market takes."

The HabaDisk 10 sports a black strip on the front panel, along with a red busy light. And it makes a noise somewhere between the quiet clicks of the Atari and the bweeps of the Supra.

Humphrey says that Haba's 10Mb disk can withstand most normal transportation. "I treat mine really badly. I carry it by the cables and it still works fine. And power fluctuations don't affect it much either. Our building has really bad power, but we've had no problems with the disk during fluctuations or even during brief power failures—although the disk loses its place."

Humphrey says, "Originally our hard disks were bought by product developers because 10Mb was what was available. Now they're bought by BBS owners and operators and people who are enthusiastic about Ataris in general. We're trying to encourage people to use our hard disks for product development on the ST."

SPEED TESTS

We performed two different tests on the hard disks to see how fast they operate— obtaining radically different results on each hard disk unit in the office. What we learned was that the more files and folders are present on a hard disk, the slower it accesses individual files. Still, even our fullest hard disks were significantly faster and more convenient than floppy disk drives.

We tried to get standardized speeds by re-running our tests off the root (first) directory, but this didn't make a significant difference. And nobody at **Antic** was willing to let us erase all their hard disk files just for a test. Also, we couldn't find a clear-cut ratio between the amount of bytes in use and the amount of speed drop-off. The types and arrangements of files and folders on the hard disk seemed to have something to do with it.

However, we did manage to run the tests on an otherwise empty SupraDrive, and the increased speed was startling.

Our first test consisted of a program that reads and writes a DEGAS picture to the hard disk 10 times. The "clean" SupraDrive did it in 14.5 seconds, or 44.2K per second (640,680/14.5)—three times faster than our fastest hard disk operating with a normal amount of files.

As for our hard disks with substatial files, the fastest in this test was an Atari Hard Disk which read and wrote a DEGAS picture 10 times in 48 seconds, for a transfer speed of (640,680/48) 13.3K bytes per second. However, **Antic's** second Atari Hard Disk took one minute and 38 seconds, or (640,680/98) 6.5K bytes per second.

The second fastest drive was a SupraDrive with files, which took one minute and three seconds, or (640,680/63) 10.2K bytes per second. Slowest was the HabaDisk 10, which required two minutes and 35 seconds to perform all 10 read/writes, for an average of (640,680/155) 4.1K bytes per second.

SECOND TEST

Our second test requires no programming and could be reproduced by any ST hard disk owner. For this test we wanted to see how fast the DEGAS SHOPIC slide-showing program would flash pictures to the screen.

Normally, running SHOPIC from a

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BY LLOYD BURCHILL

VIDEO STRETCH

Rubber visuals in ACTION!



Stretch visual images like silly putty on any 8-bit Atari with at least 48K memory and a disk drive. Video Stretch requires the ACTION! language cartridge from Optimized Systems Software. (Disk subscribers this month will find a runtime version that doesn't require ACTION!) Paddle controllers are recommended.

Outstanding new graphics possibilies are still being discovered on the Atari 8-Bit computers. The Video Stretch program will vertically compress or stretch an entire screen and select different parts of it to view—in real time. It's a spectacular, eye-catching effect.

Video Stretch can be used for an impressive slide-show program, or just to see how your favorite screens look when warped all out of shape. In any case, the program demonstrates that the 8-bit Atari is still capable of surprising new feats.

The program will work with its own Graphics 9 sample picture. Or you can use your own pictures made with Micro-Painter, Graphic Master and Computereyes. If you have none of these, use *Rapid Graphics Converter* (**Antic**, November 1985) to change your images into a compatible format.

TRYING IT OUT

You will need a pair of paddle controllers plugged into port 1. Paddle 0 controls the size of the display and paddle 1 selects the portion of the image to be seen. You can also use this program with a touch tablet, but it doesn't work quite as well as the paddles. And of course you can write your own routines to send values to Stretch( ).

Antic Disk subscribers: This month as a bonus you'll find a "runtime" version of Video Stretch that operates without the ACTION! cartridge. Follow the disk Help file instructions for loading STRETCH.EXE. This listing was too long to print in the magazine, and it cannot be adapted by the user as the ACTION! source code can be.

Carefully type in Listing 1, STRETCH.ACT, following the instructions in the ACTION! manual and

continued on page 44

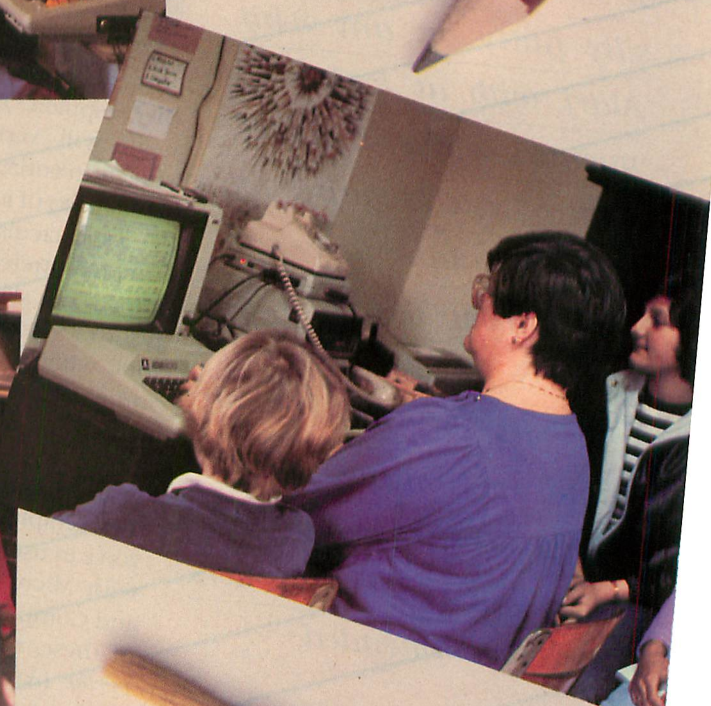
ATARI

After five years in the classroom

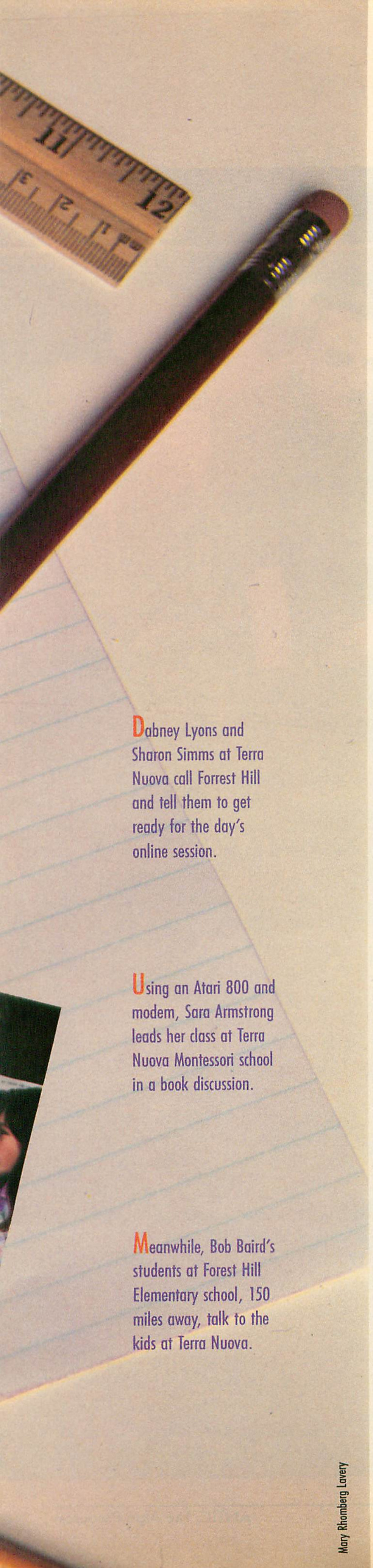
STILL MAKES THE GRADE







BY GIGI BISSON, ANTIC ASSISTANT EDITOR



Dabney Lyons and Sharon Simms at Terra Nuova call Forrest Hill and tell them to get ready for the day's online session.

Using an Atari 800 and modem, Sara Armstrong leads her class at Terra Nuova Montessori school in a book discussion.

Meanwhile, Bob Baird's students at Forest Hill Elementary school, 150 miles away, talk to the kids at Terra Nuova.

Mary Rhomberg Lavery

When you're trying to get kids interested in computers, Atari's game machine image is a plus, not a problem.

"The Atari has the best graphics and sound and that's what turns elementary school students on," says Jolene Morris, the computer education coordinator for a Utah school district that uses 720 Atari 8-bit computers.

In the Caribbean Islands, Mrs. Jose Orlandi, an occupational therapist specializing in learning disabilities, uses the graphic capabilities, colors and sounds of her Atari 400, 800 and 800XL computers to develop eye-hand coordination, and teach color and shape recognition to handicapped children.

The 16-bit Atari ST computers also score points with educators for superior graphics and sound. At Computer Curriculum Corp. of Palo Alto, California the Atari 520ST was chosen to replace dumb terminals that had been included with the CCC Microhost educational minicomputer system for nearly 10 years. Now the ST's vibrant colors and high-resolution graphics are major selling points for this dedicated education system.

Teachers consistently agree that the price, reliability and ease of use of the Atari 8-bit computers make them great for learning. The problem then, is not image, but reality: Atari educational software is tough to find. But with imagination and hard work, many teachers are getting around that obstacle.

SOFTWARE HUNT

"I've been waist deep into it. I get computer burnout sometimes," Jolene Morris says. "But unless you're this involved, you don't know where to go."

For Morris, hunting down affordable, high-quality software requires a bit of ingenuity. On the side, she teaches programming classes at Utah State University. Naturally, the students are assigned to write educational programs and the best programs are used in Morris' elementary classes. She has downloaded software from bulletin boards all over U.S and wrote many of her collection of 250 public domain programs herself.

"If you want software, you write your own," Morris says. "A programmer can't write good educational software; only a teacher can. A teacher's software may not have the greatest code, but there are some good pedagogical things in there."

With school dollars so tight, money *is* an object. "You can't touch an Apple or even a Commodore for the price," Morris says. By going for Ataris instead of Apples or IBMs, the 80 elementary schools in her district can afford five times as much hardware.

For commercial software, the Utah school district uses Batteries Included's B/Graph in junior high school math classes, the AtariWriter word processor, Broderbund's SynFile+ and SynCalc. "The Factory (from Sunburst) is great," she says, "But at $49.99 there's no school alive that can afford more than one copy."

Each class of 36 students is split in two groups. One group uses the Ataris hands-on, while the other group watches lesson projected onto a big-screen televison. Even with only enough machines for half the class, Morris says, "I'm really very fortunate to have so many computers."

"It's time-consuming to write your own software; I'd like to see a network or clearing house where Atari educators could collaborate," says Morris, who once ran two bulletin boards for that purpose. She put out the word about her 256 public domain disks, offering to send a disk full of her programs in exchange for just one new program.

"I got so many requests, I just couldn't do it—at least three letters a day from all over the world," she says, "There's a burning need for Atari educational software out there."

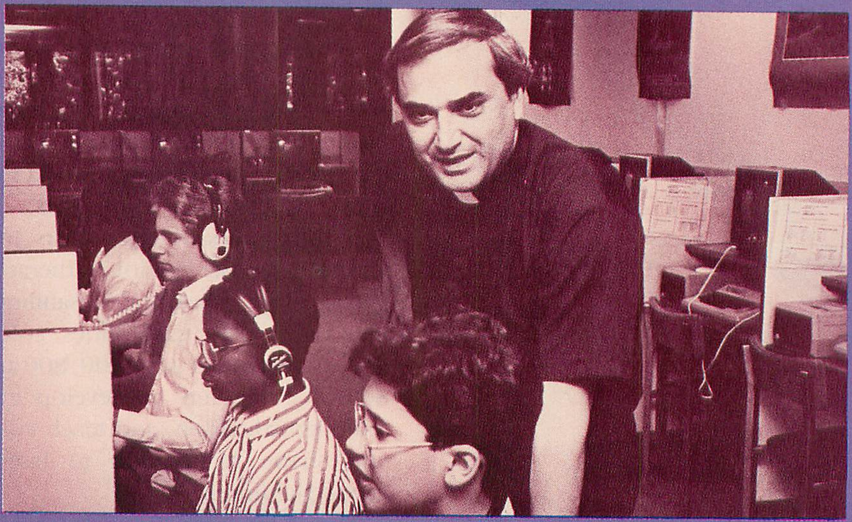
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LEARNING LATIN WITH 64 ATARIS

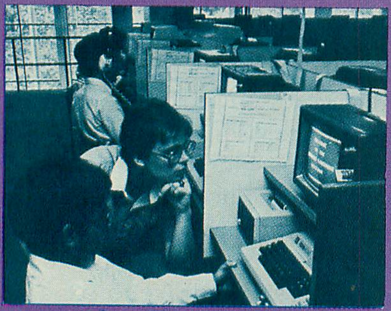
Something's wrong with Rev. Nicholas Lombardi's students. "I assign tests on their *own* time and they'll do it. I still can't figure it out." he says with a New York accent and a hearty laugh.

"So many kids wanted to take the quiz on Virgil's 'Aeneid,' I had to put a password on it so they wouldn't take the test before they finished the class. I swear it," Lombardi says, adding—one imagines, in jest—"Kids are very easily fooled."

Lombardi's students may think they're playing games in the "language arcade" at Fordham Preparatory School, an affiliate of Fordham University in the Bronx, New York City. But they're actually learning Classical Greek, Latin, French, German and Spanish on 64 Atari 800XL computers linked to a Corvus 20-megabyte hard disk drive.



"The computer is the only teaching aid I've found that kids will use outside of class," says Rev. Nicholas Lombardi.



Computerized quizzes spark healthy competition among students.

The greatest advantage of the computers is that they have created extra class time. Lombardi does the teaching. The computers do the dirty work—vocabulary drills, grading, and recording. "The computer is just a teaching aid like an overhead projector, textbook or chalk board," he says. "But this is the only one I've found that kids will use outside of class."

If Lombardi had his way, more computers would be used to teach Pascal the philosopher than Pascal the programming language. "Computers are so bogged down in math and sciences. But they're ideally suited to the humanities."

"I'm a much better teacher than any computer." Lombardi says. "I'm absolutely convinced of that." "Teaching is a personal sharing of ideas. A computer can't communicate on its own, it's just a medium," he says.

SPACE INVADERS

"Many teachers are hostile about using computers, or afraid they'll be replaced by the machines," Lombardi says. "Six years ago, I was too." If he had not been so determined to beat a co-worker at Space Invaders, Lombardi might never have put Atari computers in his classroom.

Another language teacher, Rev. Russell Sloan, brought his Atari computer to school. "He said it might have possibilities for teaching. He was playing Space Invaders," Lombardi recalls. He took one look at Sloan zapping aliens with a joystick and was appalled. "I told him his mind had completely disintegrated," Lombardi says.

Sloan said, "Why don't you just go play with the machine?" Skeptically, Lombardi took it home during an Easter break. He got fascinated by a program listing in a magazine and started typing in a game. "About halfway through I had to know what all those strange words meant," so he bought a programming book. By end the of Easter vacation, he knew BASIC.

He created Pac Vir (that's Latin for Pac Man) to teach passive voice in Latin. Using the Atari cassette recorder with a simple programming POKE, Lombardi's own voice recites vocabulary through the monitor speaker.

No other machine could do that without special cards. And a speech synthesizer would require

more memory—significantly. He tried using a speech synthesizer, but the lack of clarity made it worthless. "Se habla espanol" in mechanized speech would just impede teaching proper pronunciation.

FORDHAM BBS

Eventually Lombardi and Sloan wrote 169 educational programs teaching French, Spanish, German, Latin and Greek. These programs, originally written for the Atari, were ported over to the Apple II and marketed by Learning Technology, Inc. For information about the Atari versions of these programs, contact Lombardi at the Fordham Jesuit BBS—(212) 579-2869—where he's the sysop.

The Language Arcade computers are used for quizzes, drill and practice outside of class, never during regular clasroom hours. "I get a real kick out of the articles you see knocking drill and practice and pushing simulations, which I think are a waste of time," Lombardi says. "If you can just get students to drill more. . . well, teachers have been trying to do that since language study began."

Lombardi figures he can buy four complete Atari setups for the price of one Apple. Why is the Apple so popular then? "Apple markets to educators aggressively. And teachers really need an 80 column screen for tests and word processing."

"My pet peeve has always been that we saw the Atari computer as the best possible computer made for education, but Atari never saw the potential," Lombardi says. "Don't they realize that kids go home and buy the same machine they use in school?"—Gigi Bisson

Many user groups create public domain software collections: The Jersey Atari Computer Society created a Print Shop graphics disk, for example. Morris' local user group hopes to do a similar project with education. If you are interested in assisting or contributing software, write to: Atari Computer Enthusiasts of Salt Lake, P.O. Box 26664, Salt Lake City, Utah, 84126.

Teachers don't make hardware purchases, administrators do. For Roland Fetzer, a Brooklyn, NY elementary school teacher, that's the problem. His classroom is equipped with Apple IIe and Radio Shack TRS-80 computers, "and compared to my Atari they are primitive," he says. "Both computer teachers in the school are Atari users, but we cannot convince any administrators to buy Atari computers."

EXCITING THREE

Four years ago, Helen Shephard became involved as a volunteer in a research project to determine the best use of computers in a sixth grade class at the Julia Randall Elementary School in Payson, Arizona.

"Our struggles with the Logo language highlighted the fact that changes in lifestyle since the 1940s had robbed at least 80% of the children of developing thinking skills. We mean visual thinking, decision making and accepting challenges," Shephard says.

To develop what she calls the "Exciting Three," she uses Atari computers. Visual Thinking is first, with four months of mastering Logo. Second is Decision Making by creating stories with AtariWriter following the

continued on next page

methods of professional writers—several rough drafts before the final draft. Third in the Exciting Three is Challenge Accepting as students illustrate their stories using Super Sketch and print them in color on an Okimate 10 printer.

"Nobody is to blame that the children have been robbed of an opportunity to practice visual thinking. We adults were busy blaming somebody else and in the meantime the real culprit, lifestyle, escaped scot-free," she says.

ONE IS ENOUGH

Not all schools need a truckload of Atari hardware. Rebecca Pyle's second grade class at Mechanicsburg School in Urbana, Ohio has only one Atari 800 and an old TV set.

She brought in a few books of very simple programs and turned the kids loose. A couple of the brighter students broke the ice by typing in some short graphics programs. "I never gave any formal programming instruction," she says, "but pretty soon someone got the bright idea to change parts of the program to see what would happen. Now the kids are fighting to get back to the computer and 'play'."

PEN PALS ONLINE

Every Monday after lunch, Montessori teacher Sara Armstrong types a question mark and the discussion begins.

Her students at Terra Nuova Elementary School in the San Francisco suburb of Hayward, California use an Atari computer and modem to talk with kids at Forest Hill Elementary, 150 miles away high in the small mountain town of Auburn.

The Atari Sister School Network, a project spearheaded by Atari Inc. was once a group of 10 schools. Atari donated the hardware and even paid for long distance phone charges between schools. Using a prototype gadget called the Piodyne Switch, two or more users could conduct a conversation or leave messages. The schools used the system to write interactive stories, with each taking turns writing a chapter in the tale. When Atari Inc. dropped the program, Terra Nuova and Forest Hill hung on.

Now, the schools both read the same books and hold interactive discussions about them online. Last year, this project won the two schools a Golden Bell Award from the California State School Board Association for innovative use of computers in the classroom.

Armstrong bubbles with enthusiasm when she talks about how one Atari computer has enriched her classroom of 14 students aged 9-11. One girl at Forest Hill always talked the most during the online book discussions. "My kids would say, 'What's she going to say now, we're always interested in what she has to say.'" The girl's parents were surprised to find this out because she was always very withdrawn. "But the computer brought her out and it changed her life," Armstrong says.

At the year's end, the kids from Forest Hill met their online pen-pals in person on an exciting three-day field trip to the city. They slept on the school floor at night and spent days touring museums and aquariums.

The children bring their own experiences to the online sessions, and they learn about the subtle differences in urban and rural life. "When I ask the kids why they think telecommunications are important, they say, 'If you can see your ideas, not just hear them, you get into them more," says Armstrong.

FIVE YEARS AFTER

For a short time in 1981, the old Atari Inc. aggressively pursued the education market. The Atari Institute For Educational Action Research gave away $1 million in hardware and cash stipends for educational projects.

The institute's vision, according to then-director Dr. Ted Kahn, was to "demonstrate how the power of the smallest chip of silicon. . .can unleash a massive expansion of human potential and give our generation and future generations. . .the gift of lifelong learning."

Five years is hardly a lifetime, but most of those Atari Institute computers are still in use. Atari 8-bit models are used exclusively at 257 U.S. Department Of Defense schools for children of military personnel around the world.

Under Jack Tramiel, Atari Corp. still donates hardware to worthy causes,

ATARI EDUCATIONA

When purchasing software, who can you trust? The Educational Products Information Exchange (EPIE), education's only non-profit consumer agency, provides objective information about educational software to parents and teachers.

EPIE's services include: The Educational Software Selector (TESS) a directory of software for pre-school through college. With 948 pages, TESS provides everything you need to know about 7,800 programs for every major computer used in schools and homes. Included are EPIE recommendations, references to magazine reviews and profiles of 625 software suppliers. EPIE Online, a searchable, electronic version of TESS can be found on CompuServe, along with EPIE Forum for educators and students. (Type GO EPIE at any ! prompt.)

For more detailed information, reply via CompuServe Easyplex mail to 70007,454 or contact EPIE at P.O. Box 839-O, Water Mill, NY 11976. (516) 283-4922.

SWAPPING SOFTWARE

Through Softswap, a public domain barter organization founded

but in a more restrained manner. "We're a business, not a philanthropy," says Atari marketing manager Brian Kerr. While Atari seems to have left the 8-bit elementary school market to deeply-entrenched Apple, they're getting a solid hold in the college market with ST computers.

"Atari is making a major push in all markets. Education is a natural for the ST and one we're definitely looking at," says John Scruch, director of Educational Sales for Atari Corp. Atari currently offers a 10% discount to schools and universities through local dealers.

Atari gets inquiries daily from school systems, especially from math labs because most of the accepted computer languages are available for the ST. One of largest parochial schools in Falls Church, VA uses several hundred STs. And, according to Scruch, the ST has a strong foothold at University of California's Berkeley campus. "Case Western Reserve University in Ohio is doing some very bizarre things by hooking up 68020 chips to the ST with expansion boxes," Scruch says. And universities throughout Europe, particularly West Germany, have embraced the ST with a passion.

If Atari has any plans to compete in the college education arena against computer workstation giant Sun Microsystems and ex-Apple CEO Stephen Jobs' new company Next, Inc. with their rumored 32-bit computer workstation, they're not talking about it. "It's certainly a possibility," Scruch says. "You have to keep a certain air of mystery."

Admit it or not, Atari's forthcoming IBM and Apple II hardware emulators for the ST are perfectly suited for education. "If you're looking at the school market and want to provide a clear upgrade path, giving schools a way to run their existing software on a less expensive computer is a natural," Scruch says. "And an ST costs much less than an Apple II." The recently released 80-column card for the 8-bit computers is also a boon to educators.

"We don't like to niche," Scruch says, echoing the philosophy of the new Atari Corp. "If you don't target a limited market, and you create the most powerful machine you can, people will find applications for it."

SOFTWARE SOURCES

in 1980 by CUE, (Computer Using Educators), teachers send one original public domain program, and get a different one in return. They have only six Atari disks however. "Some are quite good," says Jolene Morris, a Utah teacher, who mentions Volcano, a simulation that puts you inside the Mount St. Helen's volcano eruption.

Janice Marshall, a CUE spokesperson, says CUE modifies each disk, removing bugs and loud noises, and cleaning up the disks to meet CUE standards. The public domain programs include Apple, Atari, IBM, Commodore PET, Macintosh, and Tandy TRS-80 software. Although there are only six programs in the Atari 8-bit library, more are certainly welcome.

"You don't have to be educator to participate, but your donation must be an original educational program—not pirated commercial software," Marshall says. And if it originally appeared in a magazine, Softswap needs a release from the magazine.

Softswap, c/o San Mateo County Office of Education, 333 Main Street, Redwood City, CA 94063. (From outside the U.S., please send $5 for shipping.) —Gigi Bisson

VIDEO STRETCH
continued from page 37

save a copy before you run it. If you just want to see Video Stretch operate on the Graphics 9 demo picture, type D from the main menu.

If you have some 62-sector microscreens to try it with, choose the L option from the main menu. The program will display any 62-sector file named D:PICTURE. You can change this default name by altering the filename in the Load() procedure.

You may alter the program to accept any 192-line graphics mode. To make the program accept pictures created in Graphics 15, for example, just redefine IR at the beginning of the program as 14, and change the graphics call in Rubber_Band to Graphics(15). If you have a non-XL computer, Graphics(15) is not available. You can replace it with Graphics(8), and the display will fix itself as soon as Stretch() operates.

Similar changes can be made to the program to make it work on any 192-line graphics mode, namely Graphics 8, 9, 10, 11, 14, and 15. For the little-used Graphics 14, change a*40 in Sinit() to a*20.

HOW IT WORKS

The program is written in ACTION! from Optimized Systems Software, which is ideal for the combination of speed and arithmetic that is required. The Stretch() routine needs two parameters; the first is the size, in scan lines, of the image that will appear on the screen. Normal size is 192 lines. You can choose any size from one to about 500 lines and the image will be proportioned correctly.

Since an image bigger than 192 lines can't be displayed all at once, the second parameter tells what line of the original image will appear at the top of the screen. (It should be between 0 and 191.) This allows you to scan any portion of the expanded image. It also works with images that are smaller than full-size, allowing you the interesting capability of expanding the picture and moving it up and down.

DETAILS

The Stretch() procedure uses several line-drawing algorithms and speedy integer arithmetic to move each scan line to its proper place on your screen.

Before entering Stretch() you must initialize it with a call to Sinit(). A space of 580 bytes is required for the complex display list generated by the program. Each line has an independent LMS instruction.

Because the new display list is so long, your choice of places to put it is limited to the first 443 bytes in any given kilobyte. If you are using high-resolution Player/Missile graphics, those first three unused pages of P/M space are ideal.

Lloyd Burchill is a high school senior from Newcastle, New Brunswick who likes to write programs with an artistic flair. In 1985 he won a national award for a program about the moons of Uranus.

HARD DISKS
continued from page 36

floppy disk will present one picture about every four seconds, for an average speed of (32K/4) 8K bytes per second.

Our results here had me scratching my head. SHOPIC displayed pictures at slightly faster than two frames per second (fps) on the empty SupraDrive, the SupraDrive with files and the Atari Hard Disk. This means they're moving nearly 64K bytes per second (2*32K). But our HabaDisk ran at half that speed—a little less than one fps—and we're still not sure why.

HARD DISK UTILITIES

Every ST hard disk is supplied with at least four utility programs. Each manufacturer has slightly different programs, but they all do much the same job:

1. Format the hard disk. This program acts much like the format disk program for the floppy disks. Like the floppies, a hard disk is born blank, and needs to be told how and where to store information on itself. You may divide one "physical" hard disk into as many as four "logical" hard disks, each with its own drive letter identifier—C, D, E, etc.

2. Boot the hard disk. This program, when placed inside an AUTO folder, teaches the Atari ST how to communicate with the hard disk when powered up. It may also be used outside the AUTO folder, after the Atari ST is up and running.

3. Clear directories. Formatting a hard disk can take as long as 10 minutes. A faster way to "erase" a hard disk is just to re-format the disk directories. In effect, the disk "forgets" where everything is stored on the disk and pretends the disk is blank, but formatted. This operation takes only seconds to perform.

4. Park the Read/Write head. This means running a program which locks the R/W head in a safe position (usually above the innermost track) where it won't be jostled against data track surfaces if the hard disk is

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MANUFACTURERS

ATARI HARD DISK
Atari Corp.
1196 Borregas Avenue
Sunnyvale, CA 94088
(408) 745-2000
$799—20Mb
CIRCLE 277 ON READER SERVICE CARD

SUPRADRIVE
Supra Corp.
1133 Commercial Way
Albany, OR 97321
(503) 967-9075
$549—10Mb
CIRCLE 275 ON READER SERVICE CARD

HABADISK 10
Haba Systems, Inc.
6711 Valjean Avenue
Van Nuys, CA 91406
(818) 901-8828
$599—10Mb
CIRCLE 276 ON READER SERVICE CARD

P:R: CONNECTION

ICD Inc.
1220 Rock Street
Suite 310
Rockford, IL 61101
(815) 229-2999
$69.95, 48K disk

CIRCLE **201** ON READER SERVICE CARD

Reviewed by Kurt Oestreich

Atari 8-bit computers don't have standard parallel and serial ports built in. Until now, if you wanted to use Ataris with non-Atari modems and printers you pretty much needed to connect them via the Atari 850 Interface Module. The 850, which was introduced in 1980, has not been manufactured for several years and is often difficult to find today.

Now along comes the **P:R: Connection**, a better mousetrap at last. The P:R: provides two RS-232 serial ports and one Centronics parallel port. This allows connection of one parallel printer, one serial modem and one other serial device such as an EPROM programmer. For most users, this should be more than enough interface capability.

The P:R: Connection is 850-compatible. Connections, software and applications remain the same. The unit's small gray case measures about four inches wide by six inches long. Perhaps the nicest new feature of the P:R: Connection is that it gets its power from the host computer, eliminating the need for an additional power supply and cord.

The exceptional software that comes with the P:R: Connection includes 850 Express (the 850-compatible version of the popular 1030 Express), AMODEM 7.2 and RSCOPE. The 850 Express is best of the three, allowing error-free uploading and downloading of files, autodialing with support for MCI and Sprint, capturing text, directories and much more.

The file PRC.SYS is included for programs such as HomeTerm that have problems with the P:R: Connection. Aye, lads, the P:R: Connection is not *totally* compatible with the Atari 850. For people into machine language, it's completely compatible on the CIO level, but a few problems arise on the SIO level. PRC.SYS acts as a translator for those programs that interface on the SIO level.

I couldn't get Atari's Plato cartridge to work with the P:R: Connection either. However, Atari is apparently considering a new Plato release that would support the P:R:. I should also mention that the Atari 1200XL computer requires a small hardware modification to work with the P:R: Connection. Complete instructions are given in the documentation and the entire operation should take less than five minutes.

The P:R: Connection documentation is spectacular. It contains the complete R: driver source listing and extensive information on pinouts of industry standard peripherals and the P:R: ports. Also included is a detailed account of the workings of the RS-232 ports.

All in all, ICD's P:R: Connection is a fine package, both for novice computer users and advanced programmers.

WRITE 80 WORD PROCESSOR

MTS Software
P.O. Box 623
Williamsville, NY 14221
(716) 634-0578
$59.95, 48K disk

CIRCLE **242** ON READER SERVICE CARD

Reviewed by Andy Eddy

Write 80 is a word processor with built-in 80-column display, but the

continued on next page

amount of memory used for the 80-column feature interferes with the computer's handling of other tasks and limits the program's usefulness.

Unlike the ACE80 cartridge reviewed in the July, 1986 **Antic**, Write 80's expanded 80-column display is not compatible with other word processors or text editors. It provides 80 columns only in the text entry and edit modes. When it reaches a menu or prompt, the program reverts to 40 columns.

Write 80 is very slow to accept text from the keyboard. Anyone who types faster than 15 words per minute will lose characters because of the lack of a buffer. The developers of the program said they couldn't provide a buffer because of the 8-bit Atari's memory constraints, but they feel that Write 80 still makes a good beginner's word processor.

Write 80 displays a 19-line chunk of the page you're writing. When you reach the bottom of the screen, it clears, redisplays the last two lines at the top and leaves a new 19-line area to work with. This sluggish redrawing of the screen is necessary because of the redefined character editor for 80 columns. But the delay also gets annoying when any changes are made in the text, such as with a global replace.

Write 80 saves text page by page. You can't save a whole document. When you reach the end of one page, you must save it before continuing with the next. This makes editing a real chore. If there is no room to add to a page, you must reformat each following page.

If you can work around these problems, the program is functional, with control codes to accomplish the more difficult word processing tasks. There are even some fancy features available, such as the print preview, which shows a scaled-down diagram of your entire page on the screen—the text layout is represented by hash marks. Margins and other page definitions are easy to change to your liking. Write 80's manual is very helpful too.

The 80-column display slows up the word processor

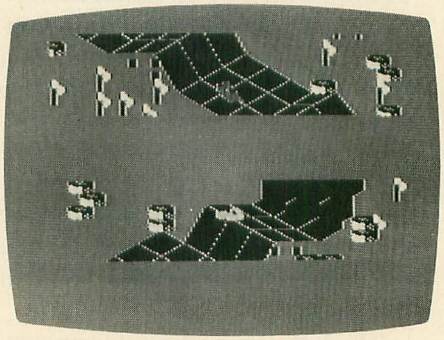
All in all, the developers of Write 80 should be proud to have squeezed as much as they did out of the Atari 8-bit computers. To their credit, they came up with a decent word processor, even though memory limitations slow it down.

RACING DESTRUCTION SET

Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
(415) 572-ARTS
$29.95, 48K disk
CIRCLE 239 ON READER SERVICE CARD

Reviewed by David Plotkin

Racing Destruction Set (RDS) is a construction set program for enthusiasts of road racing games. It offers many options for customizing the cars and race tracks. The graphics are somewhat limited, but the fast action and multitude of options should keep you busy for quite a while.



If you don't feel like designing your own course, RDS comes with 50 race tracks, many of which resemble world-famous courses such as the Indianapolis 500 and Laguna Seca. The race tracks are loaded from disk via an easy-to-use menu system. However, some tracks take over a minute to load.

RDS is first and foremost a racing game. You can race against either a human opponent or the computer. The screen is split, and each of the players can see their car plus a very short section of the track. If the two cars are near each other on the track, both cars appear in both windows.

Even if you're "just" racing, there are many options to spice up the game. You can vary the number of laps which constitute a race, change the backround graphics and change the difficulty level—which changes the top speed available and your ability to survive wrecks. But these are only the basic options.

Increasing the gravity makes the car roll over more during jumps. You can also choose the destruction derby, in which part of the object is to disable the opponent's car. You can bump him off the road, or use weapons such as mines, oil slicks or the "crusher."

The ability to customize is the heart of construction sets, and RDS is no exception. First, you can customize your car, choosing the size of the engine, tires and even the vehicle type itself. Ten different kinds of vehicles are available, including Can Am racers, dune buggies and a dirt bike, each with its own set of engine and tire possibilities.

To customize, simply move a cursor on the screen with the joystick, pressing the button to make your choices, which affect important racing variables such as weight and traction—although curiously not gas mileage. Relative values of these variables appear on the screen to help you choose: for example, you might want different tires for a dirt surface than for concrete.

You can also choose armor and weapons, although these will increase

your weight and reduce your acceleration. Once you have selected a car you like, you can save it to disk for future racing sessions or further modifications.

Customizing the race track is trickier. You may choose a variety of pieces such as curves and jumps, again using a joystick-controlled cursor. Some of the pieces may be altered, varied in width and contoured with changing elevations. A variety of surfaces, such as concrete or dirt, are also available. An enlarged view of the piece you have selected appears on the bottom of the screen to help make modifications.

When you are through, you can save the track to disk and race it. However, if the program finds that two adjoining pieces don't match, it will refuse to exit, indicating which pieces are in error. Then you must figure out *why* they don't match, and fix it. Of course, fixing one piece may cause a problem with others, but this is the price you must pay for having so much power.

The control scheme for RDS is pretty standard for racing games, with joystick movement sending the car in a direction based on the *driver's* frame of reference—that is, if the car is moving down on the screen, pushing the joystick right will move the car *left*. This can be confusing.The RDS menu screens are essentially standard Graphics 0, somewhat uninspiring. More importantly, the racing scenes have a jerky motion. The cars are not well detailed, and during a race your car can get so close to the end of the visible section of track that you can't correct for track conditions in time to avoid a wreck. After you learn a track, this is not so much of a problem, but it should have been easy to fix in the programming.

Finally, the cars partially steer themselves. They'll maneuver around the curves like slot cars as long as you don't hit the curves too fast. There doesn't seem to be any way to counteract this, so some of the challenge of the race is lost.

But these shortcomings are minimal compared to the joy of building and racing your own car and tracks. If you are a racing buff, then Racing Destruction Set should provide many hours of creative enjoyment.

FOOBLITZKY

Infocom Inc.
125 Cambridge Park Drive
Cambridge, MA 02140
(800) 262-6868
2-4 players, age 14 to adult
$39.95, 48K disk
CIRCLE 241 ON READER SERVICE CARD

Reviewed by Michael Lasky

Fooblitzky is a graphics-filled strategy game that I actually found dull. The most surprising thing about this cumbersome computerized boardgame is that it is the first graphics software from the interactive fiction geniuses at Infocom.



Fooblitzky City is inhabited by dogs. The object of the game is to move around and collect four objects secretly pre-selected by the other players. Then you race back to a checkpoint. If you have the correct objects, you win.

Obstacles to prevent you from quickly succeeding include being hit by a car, opponents bumping into you and taking your possessions, and the Chance Man, a con artist/mugger who prowls the streets. A spinning wheel determines how many spaces you move in each turn.

You buy things like bananas, teddy bears and light bulbs, using "foobles" for money and noting the objects and their prices on a memo board. If a store is out of stock, you must go to another quadrant of the city to buy, but you can call ahead from a telephone booth to avoid a wild goose chase. And there is a subway to get you across town quickly.

Anything you do in Fooblitzky seems to cost money. If you go broke, you can earn more by working in the restaurant or selling possessions in the pawnshop. You start each game with exactly twice the amount needed to buy one set of correct items.

As with other Infocom games, the disk drive responds to virtually every command you make. The program, however, doesn't always react to the joystick the first time you push it. I preferred using the keyboard instead.The flipping graphics and page scrolling are well-defined "pixel-ated" drawings—somewhat primitive in design but still whimsical. The only sound effects are a few low-volume tones that can be toggled off.

Fooblitzky requires musical chairs logistics where each player takes a turn at the keyboard. There are so many rules and procedures to remember that the package contains four memo boards with colored oil pens for player notes and three—count 'em—different sets of instructions. The screen can accommodate only 25% of the playing field. Pushing the joystick button at the right time produces a miniature map of the entire board, but it's hard to read. A status line quadrant locator is of little help.

Variations to the default "house rules" can be made when booting the disk. You can change the Chance Man's mood, make crossing the streets safe, even start players with more foobles. About the only thing you can't do is make Fooblitzky more exciting.

continued on next page

ARTIST UNLEASHED, LAYOUT

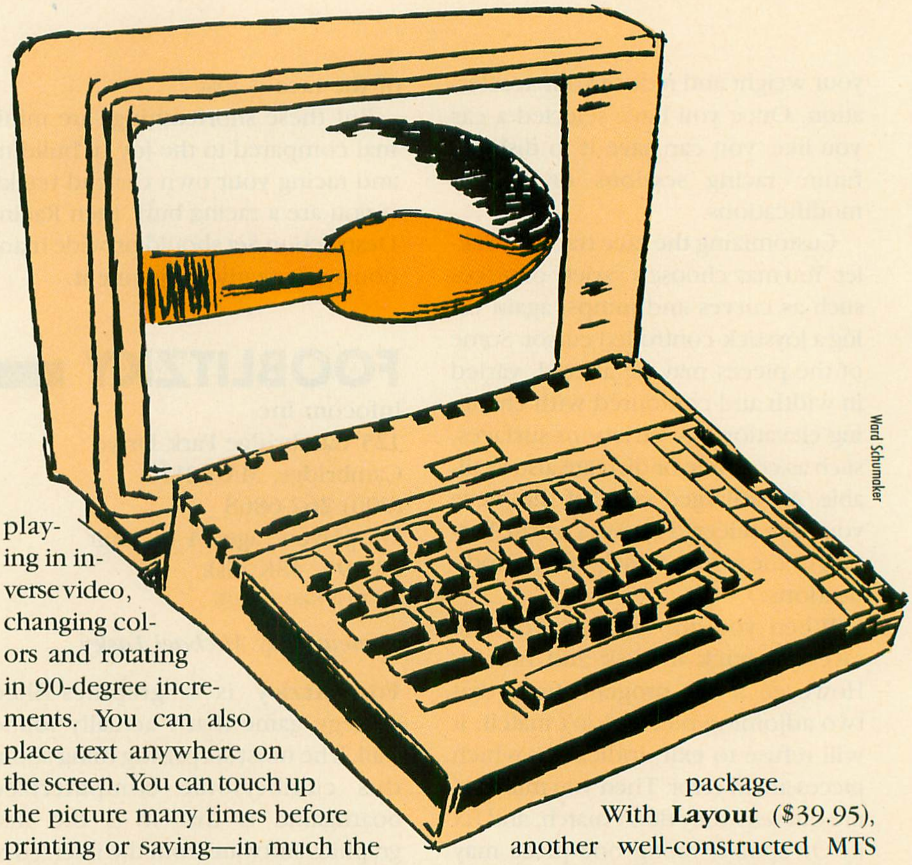
MTS Software
P.O. Box 623
Williamsville, NY 14221
(716) 634-0578
48K disk
CIRCLE **200** ON READER SERVICE CARD

Reviewed by Andy Eddy

For closet artists everywhere, MTS Software's **Artist Unleashed** ($49.95) helps bring creativity to the surface. Using a joystick, KoalaPad or Rat to control the onscreen painting dot, you can create high-resolution Graphics 8 pictures on your 8-bit Atari for saving to disk, inserting in your BASIC programs or printing on an Epson-compatible.

In the right hands, very fancy art can be created

These pictures can be enhanced or altered by stretching, inverting, displaying in inverse video, changing colors and rotating in 90-degree increments. You can also place text anywhere on the screen. You can touch up the picture many times before printing or saving—in much the same way a word processor manipulates text. Completed pictures can be moved and combined to form collages.


Ward Schumaker

Refine, the program's picture editor, breaks down your picture into grids for detail work. The section to be edited appears enlarged on the right side of the screen while the main picture remains on the left. Changes on the enlarged portion also show up on the main picture so you can check your progress immediately. Upon completion, you can use the Show function to access and display a version from disk.

A disk of sample pictures created with Artist Unleashed is included to demonstrate that in the right hands very fancy works of art can be created with this software.

Unfortunately, Artist Unleashed is not all that easy to learn. The manual describes commands only briefly. References to the Show and Refine functions send you to a page where neither topic is mentioned. Thus, like Columbus, you are frequently forced to search for discoveries in this package.

With **Layout** ($39.95), another well-constructed MTS package, you can compose newsletters, posters and advertising materials. It can be used by itself or with Artist Unleashed. Layout is not a powerful drawing utility like Artist Unleashed, but its picture editor is fine if you just need basic graphics to be combined into neat pages with text and headlines.

The accompanying data disk contains pre-programmed symbols, borders and character sets to save you the toil of making them from scratch. I felt that the border set, used with the manual's examples, was the most attractive feature of this package—it embellishes your creations with professional-looking results. User group newsletters can particularly benefit from using Layout.

Layout suffers from some of the same documentation problems as Artist Unleashed, but it doesn't hurt this program as much, because Layout is much simpler. And using Layout together with Artist Unleashed makes a graphic one-two punch that's hard to beat.

GOTO DEBATE
continued from page 33

STEP 0 option, the FOR/NEXT loop will continue to loop until A$ is X.

What's wrong with this? Well, it will usually work. But it's a classic example of tricky programming—a programmer who's being more clever than needed. The same code could be written like this:

```
10  REM LOOP UNTIL A$=X
20  INPUT A$
30  IF A$<>'X" THEN GOTO 20
```

The version with the IF/THEN GOTO is shorter. It runs faster. It doesn't use any unnecessary variables, which waste time and memory space. Most important, what's going on is expressed as simply and clearly as possible.

WILL IT WORK?

As I said, I suspect that GOTO paranoia is tied to mistaken notions about programming. One common mistake by beginning programmers is that if a program works once—or twice, or even dozens of times—then it will always work.

Actually, people in all walks of life tend to think that just because something was once tested sucessfully, it will keep working. The sad truth is that if a system is very complex, it's just about impossible to test it thoroughly just by running it over and over.

No matter how many times you run it through, a really complex system has too many possible complications that could crop up at odd times in unexpected ways. A common example of this is when you crash a program by mistyping a couple of keys and accidentally sending the computer a destructive instruction.

There is a way of making sure a program will work, but it doesn't involve testing in the usual sense. If a program has a clear, easily-understood structure which flows cleanly between well-defined parts, it's easy to make sure it will work and easy to change or improve the program.

But if a program has GOTOs that bounce *from the middle of one routine into the middle of another*, proving it will always work can be next to impossible. That's the "spaghetti programming" which sets almost any experienced programmer's teeth on edge — and it has given GOTOs a bad reputation.

People develop such extreme love or loathing of GOTOs because of fundamental misunderstandings

Spaghetti code is impossible to change safely, because it's impossible to understand. It's the worst possible way for you to use a GOTO—because there's no way to make clear exactly what you're doing.

REAL-WORLD EFFICIENCY

It's easy to overreact to the unprovability of programs. And that's where another common mistaken idea about programming shows up—the notion that a computer language, or any system of rules, can somehow eliminate any chance of error. That's the basis for "Structured Programming," in which the language, rather than the programmer, is supposed to be responsible for making sure there are no mistakes in the program's structure.

Notice that I put "Structured Programming" in quotes, with capital letters. I'm not just talking about structured programs. All of your programs should be well-structured. If they're not, it means you're programming without a plan, and your programs are lucky if they get anywhere at all. Well-designed, well-structured programs are the only kind you can really trust—and the only kind you sould write.

On the other hand, "Structured Programming" is a philosophy that insists it's more important to use "structures" than to program efficiently. "Structures" are supposed to be so important, because they make a program "self-documenting."

But in the real world, programs need to work efficiently. If a program spends too much time inside "structures," it's badly designed. If it wastes time or space, it's simply not the best program it can be.

More important, in the real world there's no such thing as a "self-documenting" program. A looping structure may help clarify the way a program works, but it's no replacement for making explicit comments (REMarks) in REM statements about how the program works.

The toughest thing about any program is keeping track of what's going on. You can keep track of only so many things in your head at once. When a program gets more complex than that, you'll start to forget details. And if you want to change or improve your program later on, the chance that you'll remember all its nuances weeks or months from now is just about nil.

There's only one practical way to keep track—doing it right in the program itself, with your logical choice of program statements and with REM text statements. Don't trust your memory for anything.

That's the way to make your program structure clear and provable. Design philosophies can help, but they're not much good unless you actually use REMark comments — lots and lots of comments—to document your program.

WORRY-FREE GOTO

So, to sum up—don't use more GOTOs than you absolutely must. But avoid tricky programming gimmicks that replace GOTOs with confusion and inefficiency.

Just keep your program as clear, clean and straightforward as you can make it. And as you go, explain with REM statements exactly how it works. And you'll never have to worry about GOTOs again!

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HARD DISKS
continued from page 44

moved or bumped. Better safe than sorry. Try to get in the habit of parking the R/W head whenever you shut off the disk.

DAILY OPERATIONS

Always make sure you turn on your hard drive and let it run for 30 seconds or more before you turn on your Atari ST. A hard disk is relativly heavy—as you noticed when you picked it up— and needs a bit of time to come up to proper operation speed. Conversely, always turn your hard drive off last, first making sure you've parked the R/W head.

Now, with the disk running at speed, start your Atari ST with your hard disk boot program inside an AUTO folder on your boot disk. If this is the first time you've booted with the hard disk, you may need to "install" the required disk icon on the GEM desktop before you can access that disk.

Do this by clicking once on any disk icon showing, which highlights the icon, then moving the mouse pointer up to the Options Menu selection. The Options Menu will drop down, and the Install Disk Drive option will be active. Click once on this, and a dialog box appears, allowing you to type in a drive letter plus text for the bottom of the icon. Select the letter for the drive you want to activate, and click on Install. When the dialog box disappears, the new disk icon should show on the desktop. If you can't see it, try dragging one of the existing icons out of the way. Your new icon may be sitting underneath it.

With the hard disk icon on your desktop, double-click on it. At this point you may use your hard disk pretty much as you would use other disk drives. There are some exceptions, such as programs that use copy-protection which require the original disk to be in disk drive A.

Some people leave their hard disks running all the time, never letting them spin down. We talked with drive manufacturers who told us this was not at all unusual, and that they expected a hard drive running all the time to go an average of over *two years* without failure. So they should last even longer running just part of the time, right?

In a nutshell, treat the hard disk gently, don't drop it, and you should get many years of service. But don't forget to back up all your important files onto floppies—just in case.

CONCLUSIONS

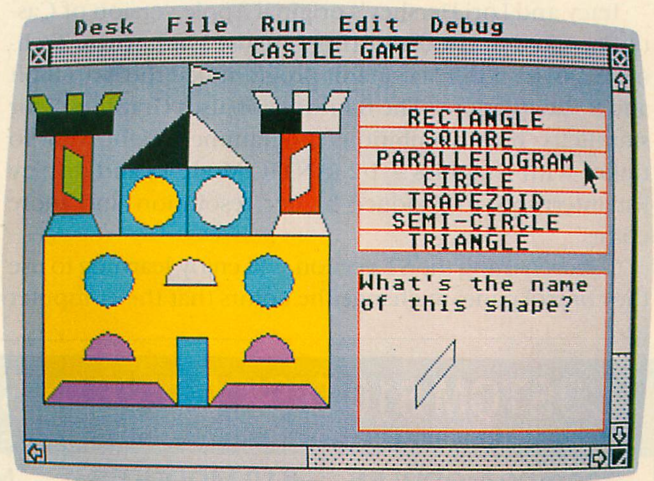
Should you get a hard disk for your ST? Absolutely, if you can afford the price and are regularly dealing with large amounts of data. Which should you buy? Well, all three of **Antic's** hard disks are almost identical in operation and performance. Our Atari hard drives have given us the least amount of trouble. But the initial trouble we had in setting up the Supra and Haba hard drives was traced to a problem in our early production ST, not to the hard drives themselves.

Until Read/Write CD ROM optical disks are cheap and available, any ST hard disk seems to be a good way to go.

For Atari 8-bits and STs

CASTLE: COLORFUL EDUCATIONAL GAME

PROGRAM BY TRACY AND LORI HERSHEY
ATARI CONVERSIONS BY BILL MARQUARDT



Build a multi-colored castle on your Atari screen with this intriguing and versatile educational game. The 8-bit BASIC version delivers four colors. It requires 32K memory with disk or cassette, but can also run on a monochrome monitor or black-and-white TV set. The ST BASIC version lets you choose seven colors from the desktop and requires a color monitor.

If you ever put together a puzzle made from wooden blocks that come in different shapes and colors, you know how to play Castle. A colored shape is added to the castle's outline when you correctly identify the shape's written name. This enjoyable educational game gives children practice in both spelling and recognizing squares, circles, triangles, rectangles, semi-circles, parallelograms and trapezoids. Older players can also face a tougher challenge—identifying each shape by the geometric formula of its area.

8-Bit Owners: Type in Listing 1, CASTLE.BAS, check it with TYPO II and SAVE a copy before you RUN the program. You operate Castle with a joystick plugged into port 1.

ST Owners: Type in Listing 2, STCASTLE.BAS, check it with TYPO ST and SAVE a copy before you RUN it. You operate the ST version of Castle with the mouse.

BUILDING A CASTLE

When you RUN the program, a screen will appear showing the seven shapes that form the castle. Pressing the button on the 8-bit joystick (or ST mouse) will take you to the prompt where you choose between the two levels of play. **Shapes** is the younger children's version where each shape must be identified by name. **Formulas** is the advanced version which requires the correct geometric formula for each shape's area.

The computer then draws the outline of the castle at the left side of the screen. To the right of the castle, it begins to display shapes, one at a time. As each shape appears on the screen, the player tries to identify it. If the answer is correct, the shape is colored in on the castle. If not, you'll have to try again.

In the 8-bit version, the cursor is simply moved around using the joystick until the correct answer is highlighted. Pressing the trigger button selects the answer. The ST ver-

continued on next page

sion uses the mouse to point to the correct answers and the left mouse button to select them.

Once you've built the entire castle, the program will display the number of incorrect guesses you made and invite you to restart the program.

PROGRAM PERSPECTIVE

To simplify all the graphics work in the program, Castle's graphics routines get their information from DATA statements. As a result, a handful of drawing and coloring routines can be used to create the shapes that form the castle—in all their different sizes and colors.

The same routines could be used to create any picture—a house, an animal, a machine—simply by changing the DATA statements. In fact, the Castle game could easily become a Horse game or a Contraption game. All it would take is a little time and design work—and a lot of DATA.

Tracy and Lori Hershey's original Apple version of Castle appeared in **II Computing**, August 1986. **Antic** Technical Assistant Bill Marquardt programmed the Atari 8-bit and ST adaptations. The 8-bit version uses Graphics 7 for simplicity, but an ambitious programmer might want to tinker with Graphics 7 1/2 (ANTIC Mode E) and display list interrupts to produce higher resolution and more colors.

Children using the ST version will enjoy learning to use the control panel to change the colors that the computer paints with. Incidentally, the ST version was written without a single GOTO statement. (*See the New Owners Column GOTO debate in this issue.*—ANTIC ED)

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THE ST RESOURCE

ANTIC OCTOBER 1986

CONTENTS

ST Disk Subscribers: For instructions on how to transfer **Antic** ST programs to 3½-inch disk, see ST Help File on Side B of monthly disk. ST programs from previous issues are available in 3½-inch format from the Antic Catalog.

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MOUSE EDITOR

"Pointer Construction Set" in ST BASIC

To use Mouse Editor, you'll need to merge it with your own ST BASIC program

Everyone who has used an Atari ST computer automatically recognizes the black arrow as the mouse pointer, or cursor. This pointer looks fine on the desktop or with a word processor. But wouldn't a rocket ship be more appropriate for a space game or a music note for a MIDI program?

Mouse Editor takes the monotony out of your mouse pointer. It is written in ST BASIC and calls on a few GEM routines. It works best in low resolution but is also fine in medium resolution. (***Antic will add high resolution capability, if we get sufficient requests from ST monochrome monitor owners.***—ANTIC ED)

The mouse pointer is actually a software "sprite" controlled by the mouse. Unlike Player/Missile graphics of 8-bit Ataris which are generated by the GTIA chip, the ST sprites are displayed without any special hardware. The mouse pointer consists of a 16×16 grid of dots with three main parts. The portion of the mouse pointer that you actually see is the "shape." Everything else in your created image is the "mask." (You do not need to use every dot on the grid.) The most important pointer element is the "hotspot." The hotspot is the single dot which selects items—for example, the tip of an arrow-shaped cursor.

TYPING IT IN

Type in Listing 1, MOUSEDIT.BAS and save a copy to disk. Check it with ST TYPO, following the instructions elsewhere in this issue. After all ST TYPO codes match your typed lines, activate ST BASIC, load in MOUSEDIT.BAS and click on RUN.

You'll see a grid and a menu on the screen. The grid is used for designing the new mouse pointer shape. The menu is used for selecting various options with the normal "point and click" method.

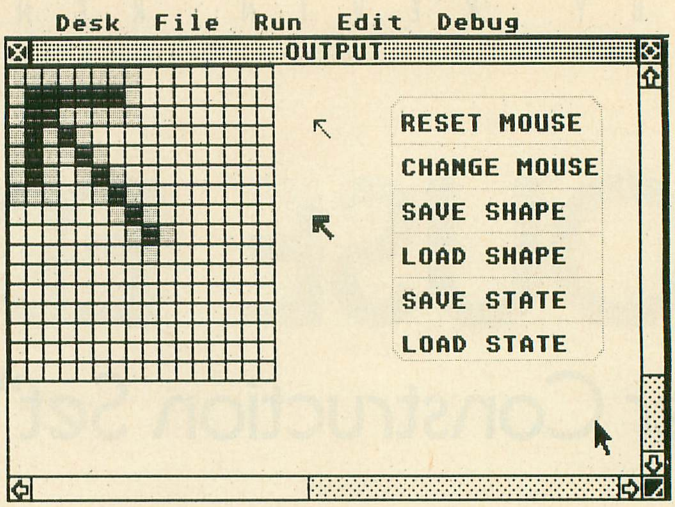
To build the new pointer shape, click the *left* mouse button on the desired grid square. To build the mask, press the *right* mouse button on a square. If you made a mistake and need to erase, press either mouse button to blank out a filled square that the pointer is on. While doing these things, you'll notice that the design also appears in two other places at the middle of the screen. This lets you see your design in more accurate perspective. The lower shape includes the mask and the upper shape omits it.

The Change Mouse option lets you change the active mouse pointer into the shape you have designed on the grid. You will first be prompted to select a square for the hotspot. Select this with the left mouse button. Next, the program will ask for colors of the mask and shape. You can select any of the normal colors (1-16). If you are not satisfied with your new pointer and wish to change it some more, select the Reset Mouse option from the menu.

The Save Shape and Load Shape options will save and load the shape and the mask that are on the grid—but not the new colors or the hotspot. After you select one of these menu options, the program asks for a filename (with maximum of eight characters plus three character extender). These options do not change the pointer that is currently active. When you select Load Shape, the active pointer will also appear in the middle of the screen where you normally see what is on the grid.

The Save State and Load State menu options only save and load the new hotspot and colors. To save the shape on the grid you must have previously used the Change Mouse function to activate the new pointer. The Load

continued on next page



The main screen of ST Mouse Editor, showing the creation of a new arrow pointer.

State function only changes the active pointer and won't affect the grid. It is advisable to use both Save Shape and Save State for your new pointer.

To use this program you'll need to merge it with your own ST BASIC program. Then, to call the subroutine, set the variable FILE$ to the filename of your new pointer and then type: gosub CHANGEMOUSE. Your new pointer will load right in and be displayed automatically.

Mouse Editor takes the monotony out of your mouse pointer

For more information on using GEM routines see *Control GEM with ST BASIC* in the April, 1986 **Antic**.

HOW IT WORKS

Below are examples of how to write the key routines of a mouse pointer generator as part of your own ST BASIC programs.

To determine current mouse status:

```
10 A#=GB
20 IOUT=peek( A#+12 )
30 gemsys( 39 )
40 MOUSE.X=peek( IOUT+2 )
50 MOUSE.Y=peek( IOUT+4 )
50 MOUSE.BUTTON=peek
   ( IOUT+6 )
60 KEYBOARD.STATE=peek
   IOUT+8 )
```

To select the mouse form out of a predefined set, where FORM is one of:

0 = Arrow
1 = Cursor
2 = Bee
3 = Pointing Hand
4 = Flat Hand
5 = Thin Crosshair
6 = Thick Crosshair
7 = Outline Crosshair
256 = Disable Mouse Form
257 = Enable Mouse Form

```
10 A#=GB
20 INTIN=peek( A#+8 )
30 poke INTIN, FORM.NUMBER
40 gemsys( 78 )
```

To set up the mouse pointer form:

```
10 poke CONTRL, 111
20 poke CONTRL+2, 0
30 poke CONTRL+6, 37
40 poke INTIN, HOTSPOT.X
50 poke INTIN+2, HOTSPOT.Y
60 poke INTIN+4, 1
70 poke INTIN+6, MASK.COLOR
80 poke INTIN+8, MOUSE.COLOR
90 poke INTIN+10, MASK.DATUM0
. . .
. . .
100 poke INTIN+40,
    MASK.DATUM15
110 poke INTIN+42,
    MOUSE.DATUM0
. . .
. . .
120 poke INTIN+72,
    MOUSE.DATUM15
130 vdisys(0)
```

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Help
STAccount provides you with on screen help through the use of TEDDY, a screen icon. If you become uncertain of your actions during the course of running the program, just click the left mouse button on TEDDY and a help screen for that particular section of the system will appear.

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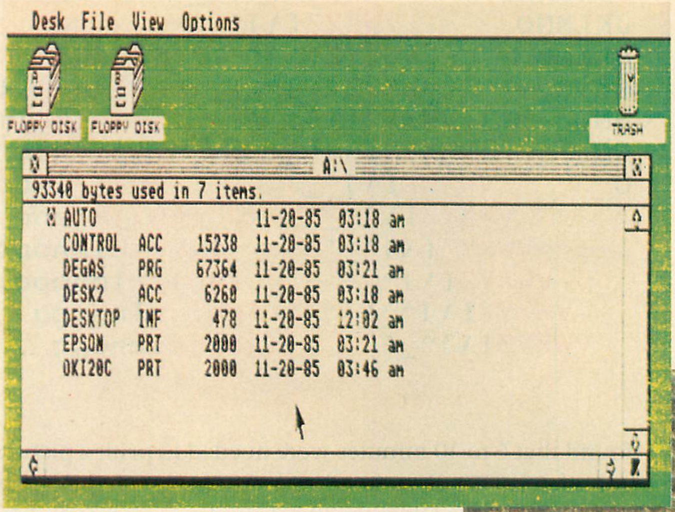
OKIMATE 20 COLOR PRINTER



REVIEWED BY PATRICK BASS, ANTIC ST PROGRAM EDITOR

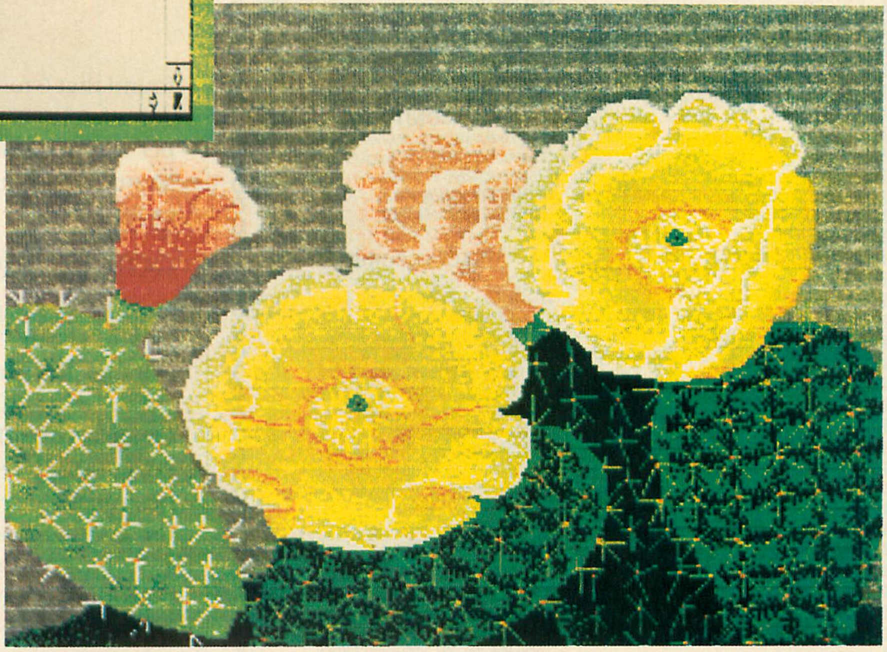
Nearly every day **Antic** gets letters or phone calls asking if there are any color printers available for the Atari STs. We now answer that for picture quality at an affordable price, the $268 **Okimate 20** color thermal (heat) transfer printer is an outstanding value.

Until now, our main complaint with most color printers has been their dull colors, which never seemed to approach the boldness and richness of the screen images. But the Okimate 20 can reproduce the colors on your Atari ST screen with amazing fidelity. You get true ruby red, jet black, lemon yellow, sky blue and over a hundred com-



color ribbon and a black ribbon. Okidata even includes an order sheet for more ribbons or paper.

Remove the printer from its box and plug it into the wall. The interface board plugs into a slot on the left side of the printer, and only fits in right-side up. (We know, we tried it upside down.) Install the color ribbon cassette by snapping it into place, thread some paper around the platen and the setup is finished. If you like, you can now run a built-in printer self-test routine to see how everything is performing.



Above, a typical GEM Desktop in OKI-20 color. At right, one of our DEGAS Art Contest winners, CACTUS.

True ruby red, jet black, lemon yellow, sky blue and over 100 combinations in between

binations in between. Tom Hudson's famous Bee picture, originally drawn with his DEGAS software, is reproduced almost perfectly, as you can see on these pages.

Not only that, but due to the waxy ink used in the Okimate 20 ribbon, the printed picture has a sleek finish which makes it look impressively professional.

Okidata has taken a different course from most other printer manufacturers. Instead of making a lot of different printers that will be compatible with all the different brands of computers, they've taken the Okimate 20 and made small, plug-in cartridge interfaces for different computers. For example, here in the **Antic** offices we have the Okimate 20 for both the Atari ST and the Apple II computers. As an experiment, we commandeered the Apple II Okimate 20 and plugged the Atari ST interface into it. It worked perfectly the first time out.

The Okimate 20 is a snap to set up. While the printer comes in a separate box, the ST Interface package includes everything else you'll need to get going—including glossy coated paper, printer cable, a software printer driver, a

To get pictures printing out, you need to run the Okimate software which drives the printer. This software may be installed inside an AUTO folder on your power-up disk, so the printer driver installs automatically when you turn the Atari ST on. After the driver is installed, all you do to print out the picture on your ST screen is hold down the [ALTERNATE] key while you press [HELP].

QUIET, NOT SPEEDY

Make sure you watch the image coming out, because you won't hear this printer working at all! Since the Okimate 20 uses "thermal transfer" instead of "impact" technology for placing images on paper, there are no screeching printheads swinging back and forth. Just a smooth, *quiet* pass of the 24-pin printhead for each color desired. By the way, the Oki 20 can also produce nice-looking text in multi-color or black. However, this printer is not the fastest or cheapest way to print text.

We timed the Okimate 20's graphics screen dumps and

continued on next page

Doing justice to ST graphics

```
GHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
HIJKLMNOPQRSTUVWXYZ[\]^_`abcdefgh
IJKLMNOPQRSTUVWXYZ[\]^_`abcdefghi
JKLMNOPQRSTUVWXYZ[\]^_`abcdefghij
KLMNOPQRSTUVWXYZ[\]^_`abcdefghijk
LMNOPQRSTUVWXYZ[\]^_`abcdefghijkl
MNOPQRSTUVWXYZ[\]^_`abcdefghijklm
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QRSTUVWXYZ[\]^_`abcdefghijklmnopq
RSTUVWXYZ[\]^_`abcdefghijklmnopqr
STUVWXYZ[\]^_`abcdefghijklmnopqrs
TUVWXYZ[\]^_`abcdefghijklmnopqrst
```

found that 6 to 10 minutes were needed to print a picture completely. We also timed text dumps at 22 characters per second—the Okimate 20 required one minute and 50 seconds to print eight paragraphs of four 72-character lines each.

COSTLY PAGES

The cost per page of Okimate 20 color printouts does add up—to about 75 cents per page, because of the special ribbons and paper required.

For best results, a very smooth paper is needed. Your Okidata cartridge pack supplies a sample sheaf of the coated stock recommended. Since the paper might not be available locally, Okidata also includes an order sheet for getting more paper. A pack of 250 sheets sells for $6.50, or about 3 cents per sheet. **Antic** got adequate reproduction from the smooth paper designed for ink-jet printers, but we were less than happy with pictures printed on regular pin-feed computer paper. Incidentally, the Okimate 20 prints quite well on clear acetate plastic, suitable for projection transparencies.

The special color ribbon cassette needed for the Okimate 20 costs $5.49 and provides enough ribbon for 8-10 pictures. The ribbons *cannot* be used twice. The separate, completely black ribbon is good for approximately 75 pages of text. It can't be reused either, and costs $4.99 from Okidata. (If you want to use slippery thermal paper, which has its own disadvantages, the Okimate 20 will print in black *without* any ribbon.)

From the above prices, we calculated that each Okimate 20 color page will cost very close to 75 cents. Compare this to the cost per page for a typical Epson dot-matrix printer, which runs slightly less than five cents.

However, if what you want is artistic *color printouts* that accurately reproduce ST screen images, the Okimate 20 is what you've been looking for.

OKIMATE 20
(Color Thermal Printer)
Okidata
532 Fellowship Road
Mt. Laurel, NJ 08054
(609) 235-2600
$268

CIRCLE 224 ON READER SERVICE CARD

Next Month in Antic

- **Budget dBase**
- **Complete personal finance type-in software**
- **GraphMaker**
- **$1,000 Programming Contest**
- **BBS Express Review**
- **Machine Language Lessons for 68000**



Ward Schumaker

ST PRODUCT NEWS

ST reviews

TIME BANDIT

MichTron Inc.
576 S. Telegraph
Pontiac, MI 48053
(313) 334-5700
$39.95

CIRCLE **203** ON READER SERVICE CARD

Reviewed by Gil Merciez

Last September, promos appeared for **Time Bandit**, promising thrilling arcade action as you battled Evil Guardians and collected the Treasures of Time, using Timegates to explore 20 different lands with 15 levels each.

At that time, MichTron envisioned Time Bandit as a relatively straight port from an earlier Sanyo version. Time Bandit authors Bill Dunlevy and Harry Lafnear had other ideas, however. Utilizing the power, speed and graphics capabilities of the ST, the authors transformed Time Bandit into a unique creation which raises standards of arcade gaming to a new high.

I have never been an arcade game freak. My joystick always seemed mired in mud, and rarely would I advance beyond the first few levels of any game requiring lightning responses to the screen action. Thus my interest would fade quickly due to frustration and boredom. However, I found it difficult to tear myself away from Time Bandit, even to write this review.

Because of the stunning color graphics, Time Bandit only runs on a color system. The copy-protected disk contains over 300K of assembly language code, and you have a choice of joystick or keyboard control.



The object of Time Bandit is to travel through Timegates into 16 different lands and recover the Great Artifacts. Each land is set in a different period of history, from ancient Egypt through the Old West and into futuristic space periods. All but one of the lands has 16 increasingly difficult levels and is protected by Evil Guardians, whom you destroy with your unlimited supply of missiles. Each level generally has a different floorplan or adds new areas to explore.

The Bandit begins with 14 lives, gaining an extra life for each 1,000 cubits accumulated. Cubits are earned by gathering treasures and keys, opening locks, solving puzzles and destroying Guardians. Your manner determines how many cubits you receive for blasting Guardians. A psychotic pace garners 50 points, while a wimpy pace gets you nothing.

The carefully-detailed Guardians come in all shapes, sizes and colors: spiders, snakes, lions, trolls, evil eyes, robots, flying saucers, ghosts and other nameless creatures. When shot, a ghost suddenly displays the Ghostbusters symbol before evaporating in a cloud of smoke. A wide-eyed red face sticks his tongue out as he is obliterated. And, unless it's a dud, shooting a nearby bomb in the Bomb Factory can cost you a life.

The amazing depth and variety of the game is apparent as you begin to explore the different lands. Each time period is unique and requires a differ-

continued on next page

ent strategy. In the Ghost Town, there are corpses to bury in the graveyard, levers to pull, combination locks to open and people to talk to. Shadowland is a Pac Man clone and a great place to pick up an extra three or four lives on the beginning levels. Some lands present mazes which can only be conquered by practice or mapping. Darkside Dare is a land of invisible mazes, and is as sadistic as any game programmer has ever coded. Certain death awaits a beginner, even on the first level.

Excalibur contains a complete text adventure as you try to unravel the mystery of the empty spaceship. The parser is of the primitive two-word variety and the vocabulary is limited but the idea is well implemented, and, most of all, fun. Other lands also require occasional text input or present custom text screens to read.

The gates to these areas are graphically represented by various landmarks in the Timegates screen. At the start, you may choose which gate to enter but as your score increases, you must evade a growing number of flying saucers waiting to transport you to a random land.

Also located in the Timegates area is a journal which tracks your progress through the lands. Once you enter a gate, only by finding keys to its locks can you return. The next time you enter that same gate you will have advanced a level.

The Guardians are constantly regenerated through portals scattered across the land. Ladders, pits, arrows and transporters carry you to different areas of the level. The Great Artifacts are reputed to lie deep within the last few levels of each land. It takes time to master even one land, but you'll never be totally frustrated. Recovering all 16 artifacts takes superhuman effort.

An interesting feature is the dual player mode, allowing two people to play simultaneously, either cooperating or in fierce competition. In the latter mode the screen is split, with both players presented their own scrolling view of the area. Six high scores along with a record of levels conquered are saved to the game disk.

The graphics of Time Bandit are superb. Animation abounds in each land, whether it be a flickering torch or a flashing control panel. And great attention to detail has been paid. Tiny glasses and bowls dot the tables, beds have pillows, trolls carry clubs. And the dozens of nasty creatures moving toward you, sometimes at breakneck speed, make it hard to believe that the ST doesn't have sprites built into the hardware.

The original ST version of Time Bandit did not include a game save option. But widespread demand has caused the authors to include this feature in a new version. The authors also fixed a bug that occurs with some early STs, in which the keyboard controller chip occasionally sends spurious keyboard characters rather than the correct joystick signal. This causes Time Bandit to occasionally jump back to the title screen in these STs because it erroneously received the letter Q, the quit option. Upgrades are available from MichTron for a reasonable $5 service charge and the return of your original disk.

It is refreshing to find a piece of software that has lived up to it's prerelease hype—and then some. Time Bandit has the credentials to someday qualify as a true classic for the ST in the same way Star Raiders does for the 8-bit Atari computers. At the least, it will be the ST arcade game by which all others are measured for some time to come.

VOLKS VM520 MODEM

Anchor Automation
6624 Valjean Avenue
Van Nuys, CA 91406
(818)997-6493
$199.95

CIRCLE **228** ON READER SERVICE CARD

Reviewed by Patrick Bass

The **Volks VM520** from Anchor Automation, manufacturers of the well-known Volksmodem line, is a Hayes-compatible 300/1200 baud modem for Atari ST computers. The VM520 is about as standard as a Hayes-compatible modem can get. In fact, I was able to start using it immediately with the same FLASH! macros we created for **Antic's** Hayes SmartModem.

The VM520 features auto-answer, auto-originate, automatic selection of baud rate and pulse/tone dialing. Two modular phone jacks are built into the back panel. The specs call for operation between 0 and 50 degrees Centigrade. That's hot! The modem understands 48 Hayes SmartModem commands—like ATDT1234567. It has nine internal registers, used for the selection of different time-outs, number of rings, etc. The VM520 returns six individual messages to the computer describing the state of the call in progress—OK, CONNECT, etc.

About as standard as a Hayes-compatible modem can get

If you don't have any terminal software, you can use the VT-52 emulator desk accessory that comes with your Atari ST. The VT-52 emulator will get you onto a bulletin board and let you look around. But it won't allow you to upload or download programs or information. If you need these capabilities, you need a more powerful terminal software package, such as FLASH! or ST-Talk.

I logged over 30 hours on CompuServe using the VM520 and can report no operating difficulties. Whenever I accessed a "noisy" telephone connetion at 1200 baud, I found that the modem dropped one or two characters per thousand. This problem dis-

continued on page 70

ST REVIEWS
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appeared at 300 baud on the same phone line.

The 42-page manual has nine sections and an appendix, but no index. It covered just about every question I had while learning to use the VM520. The package includes a 6-foot modular telephone cable to connect the modem to your telephone. There are also velcro pads for attaching the VM520 to the wall or your desk. An enclosed pamphlet has a discount offer for joining The Source online service.

The VM520 has a built-in 63701 microprocessor and comes in a molded plastic case that matches the Atari ST. It attaches to the computer via a ribbon cable with an RS-232 connector that plugs into the Atari ST modem port. To complete the setup, plug in the modem's 9-volt wall-mounted power supply and attach the phone line to the modular phone jack in the back panel of the modem. The on/off switch, located on the left side, is the only visible control on the modem. When the modem is off, your telephone works normally, and when the modem is on, the phone is disconnected.

The Volks VM520 is a good value and should be seriously considered by all ST owners who are thinking about moving up to a 1200 baud modem.

LOGIKHRON CLOCK CARD

Shanner International Corp.
453 Ravendale Drive
Mountain View, CA 94043
USA—(800) 423-8673
Calif.—(800) 626-9273
$49.95

CIRCLE **206** ON READER SERVICE CARD

Reviewed by Chuck Trunk

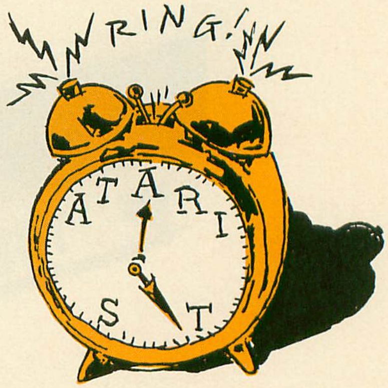
Are you tired of resetting the date and time every time you turn on your new Atari ST computer? Then the **Logikhron Clock Card** is for you. It is the first product for the ST that automatically enters the date and time whenever the computer is turned on and maintains correct chronology even while the computer is unplugged.

Developed by Softlogik Corp. and marketed by Shanner International, the Logikhron package contains a concise manual, a cartridge and a disk. The cartridge is battery powered and fits into the slot on the left side of the ST. Caution: *Never* insert or remove the cartridge while the computer is turned on.

The disk contains a desk accessory file and a resource file. To install the system, load the GEM desktop in the usual manner. Then copy the files labeled DESK5.ACC and CLOCK.RSC onto your system disk. To set the time and date, put your system disk into drive A and boot your computer. When the desktop appears, click on the Clock option from the file drop-down menu. A dialog box then appears, containing a prompt to input time and date. The procedure is similar to setting the time and date in the control panel.

You're now installed and you'll never have to input the time or date when switching between resolutions or booting—which somehow destroys the time and date previously contained in the control panel.

In some versions of GEM, there is about a 30-second delay before the control panel will reflect the correct time and date. Don't despair, though, if you have created a file within the initial 30 seconds. The correct time and date will be saved along with the file name and size.



The same situation exists when you switch between resolutions. The ST uses an internal clock/calendar when displaying the control panel. The Logikhron software updates this internal clock/calendar only at system boot or change in resolution.

I had a few problems with the clock card while using ST-BASIC with GEM in RAM, most probably due to insufficient memory. But problems disappeared when I installed my TOS ROM chips.

I feel the clock card is useful and reasonably priced at $49.95. My only criticism is that the complete sealing of the cartridge will prevent changing the battery when it expires. But Shanner offers to install new batteries at a nominal price and expects the original batteries to last at least five years.

New Products

The Atari booth at the Chicago Consumer Electronics Show was the largest in memory since the Tramiels took over the company.

The newest ST products at CES included: **Hole in One Golf** from Artworx; **Comic Strip Maker** by First Star, the company that made Spy v.s. Spy for the 8-bit Ataris; **Typing Tutor** and **Word Invaders**, two new educational programs from Academy Software; and **Winter Games** and **Temple of Apshai Trilogy** in ST versions from Epyx. Infocom had a party to announce plans for **Leather Goddesses of Phobos**, "the first adventure game with sex in it."

Activision has taken over the marketing of Audio Light's N-Vision paint program and changed the name to **Paintworks**. FTL, the folks who brought you Sundog, showed off **Micro Cookbook** (not to be confused with Electronic Art's Financial Cookbook)—yes, it's a cookbook on disk.

SOFTWARE IBM EMULATOR

Unlike the long-awaited Atari Corp. plug-in IBM PC emulator, **Ms. Em.** (tentatively priced at $150) is an IBM emulator in *software*. Programmer Daniel Rosengarten, who has a patent pending on his invention, says a 520ST running Ms. Em. (short for MS-DOS Emulator) will have 448K of usable memory. In "clone" mode, Ms. Em. runs at half the speed of an IBM. In "compatible" mode, it runs 70% faster, but uses an additional 32K of memory.

With a 5 1/4-inch drive, the simulator can run popular IBM programs such as VisiCalc, Sidekick and Wordstar. So far, Flight Simulator is the only program Rosengarten has been unable to run on the PC-compatible setup.

A 520ST or 1040ST can read and write to IBM 5 1/4" floppy diskettes with a **Microbyte** disk drive. Available in IBM XT-compatible, double-sided/double density 40-track version ($269), or IBM PC AT-compatible double-sided/quad density 80-track version ($279), it includes a direct-connect cable and six-month warranty.

Paradox Enterprises, 8444 E. 19 Street, Tucson, AZ 85710. (602) 296-4650. BETA, FINAL.

CIRCLE **227** ON READER SERVICE CARD

The **BigFoot Clock Card** ($59.99) with battery backup fits inside an ST cartridge. **EPROM Boards** ($17) fit the ST cartridge slot; are silk-screened, pre-drilled and accept EPROM types 2764, 27128, and 27256. Protective plastic cases are also available to prevent unwary users from inserting the circuits upside down.

BigFoot Systems, 2708 E. Lake Street, Suite 207, Minneapolis, MN 55046. (612) 722-9515. PRESS.

CIRCLE **228** ON READER SERVICE CARD

With **AC/FORTRAN** ($195), Macintosh programs written in Microsoft FORTRAN, a version of AC/FORTRAN, can be easily ported to the ST. The first full ANSI-standard FORTRAN 77 for the ST, AC/FORTRAN features IEEE floating point numbers, linker, library manager and a full-screen source-level debugger. It is written in assembler for fast compilation and uses the GEM interface.

Absoft Corp., 4268 N. Woodward, Royal Oak, MI 48072. (313) 549-7111. PRESS.

CIRCLE **229** ON READER SERVICE CARD

In the real-time world of **Breakers** ($44.95), the action keeps moving even when you aren't. This science fiction text adventure game has a 1,500-word vocabulary.

Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. (415) 479-1170. PRESS.

CIRCLE **230** ON READER SERVICE CARD

Prospero Pro Pascal, a full ANSI 770X3.97 standard Pascal compiler, has 7 and 16-digit precision floating point, separate compilation and 4 byte integers. It features full GEM, AES and VDI bindings. Turbo Pascal source code will port over with minor modifications.

Prospero Software, Ltd., 190 Castelnau, London SW13 9DH, England. PRESS.

CIRCLE **231** ON READER SERVICE CARD

Two more translations from German join the Abacus line-up of ST reference books. The **BASIC Training Guide** ($16.95) is aimed at beginning ST BASIC programmers. **Graphics and Sound** ($19.95) describes how to create visual images and music.

Abacus Software, P.O. Box 7219, Grand Rapids, MI 49510. (616) 241-5510. FINAL.

CIRCLE **232** ON READER SERVICE CARD

Deserving special mention for their creative software names is Quack Software Company with **Squeeg and Unsqueeg** ($24.95). Even difficult files, like executable programs, can be squeezed to almost half their original size with this GEM-based file compression utility.

Quack Computer Co., 10 Freshman Lane, Stony Brook, NY 11790. (516) 689-8738. PRESS.

CIRCLE **233** ON READER SERVICE CARD

Even when your ST is turned off, the **LCM-200 Logikhron Clock Module** ($49.95) continues to keep time. The clock in an ST cartridge has a battery back-up. Comes with software for automatically installing the clock each time you power-up.

Shanner International, 453 Ravendale Dr., Mountain View, CA 94043. (415) 964-2992. FINAL.

CIRCLE **234** ON READER SERVICE CARD

The Atari ST Explored (approximately $16), is a guide to the operating systems and languages of the ST series. Covers GEM, TOS, BIOS, ST BASIC and Logo, configuring the keyboard, networking and 68000 assembly language.

Kuma Computers Ltd., 12 Horseshoe Park, Pangbourne, Berkshire, RG8 7JW England. PRESS.

CIRCLE **235** ON READER SERVICE CARD

Disk Library, a file manager organized like the card catalog found in public libraries, cross references, categorizes and searches disk information at your fingertips. **Diablo**, an arcade-style maze game, is based on Diablotin, a European game consisting of tracks, panels and a ball. $44.95 each.

Classic Image Software, 510 Rhode Island Avenue, Cherry Hill, NJ 08002. (609) 667-2526. FINAL.

CIRCLE **209** ON READER SERVICE CARD

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*New ST product notices are compiled from information provided by the products' manufacturers. **Antic** assumes no responsibility for the accuracy of these notices or the performance of the product. Each mention is followed by a code word indicating that, at press time, **Antic** had seen a FINAL marketable version, near-final BETA, earlier ALPHA, incomplete DEMO, or PRESS release.*

Reviewed by DAVID PLOTKIN

SOFTWORKS BASIC

Fast, compiled BASIC for the experienced

Softworks BASIC ($79.95) is a compiled BASIC for the Atari ST. It offers considerable speed advantages over the ST BASIC provided by Atari, but is not for the new programmer or novice. It comes on a single disk, and includes extensive GEM support for those knowledgeable enough to use it.

This BASIC's enhancements include extensions to string-handling commands and up to seven-dimensional arrays. String arrays are supported, as well as Print Using. Softworks BASIC (SB) also supports structured variables, similar to RECORD types in ACTION! or Pascal. String handling is one of the better parts of this BASIC. Not only are the MID$, LEFT$ and RIGHT$ commands supported, but substrings may be extracted by string position, counting either from the left or the right end of the string.

Routines to move blocks of data around in memory are also included. SB includes a fairly complete set of standard features such as FOR/NEXT, IF/THEN/ELSE and subroutines, but some features of more advanced BASICs are missing. There is no provision for subprograms, WHILE or CASE.

SB does not have an editor, so you'll have to get a word processor—but not ST Writer—which generates standard TOS files. Softworks recommends 1st Word, even to the point of including a commands summary sheet.

After composing your program on a word processor, save it to disk and return to the GEM desktop. Then start the compiler, which tries to compile the program and generate a .RUN file.

Errors encountered during the compile generate a message which appears on the screen only for a moment—you had better keep your eye on it. This is a most unsatisfactory way to inform the user about errors in the file. Either a disk file should be written or the message should stay on the screen longer. You must correct errors in your source file with the editor, re-save and re-compile. Since this cycle requires several programs, it can take a while to complete. And, of course, changes will be necessary to take care of any program bugs. While this process is drawn out, it's not too different from other compiled languages.

Supports virtually all commands available, but you must be familiar with GEM and XBIOS

The compiled .RUN file is in P-Code rather than native 68000 machine code. It's not as fast as a true compiled language such as C or Pascal, but it's two to 20 times as fast as ST BASIC. SB doesn't do calculations much faster than ST BASIC, but string handling and disk access for both random and sequential files are much faster.

The .RUN file produced by the compiler can be placed on a disk along with the runtime package, B.RUN. One advantage of a separate runtime package is that several .RUN files can be on the disk, so you can CHAIN from one to the next, but only one copy of B.RUN needs to be on the final disk, thus saving disk space.

By using GEM's "Install Application" from the desktop, you can set up your disk so that double-clicking on any .RUN file automatically loads B.RUN, which then loads and runs your file. This is handy for distributing commercial software generated from SB. A one-time $25 fee is needed to license B.RUN for your own disks.

GEM support in Softworks BASIC is a mixed bag. If you write a program

which doesn't use GEM, it will run on an Amiga or Macintosh because SB is also available for them. As on those machines, all machine-specific commands for graphics, sound, windows, etc. are handled via the Toolbox command. On the ST, all access to GEM (including AES, VDI and GEMDOS), as well as access to BIOS and XBIOS are also through the Toolbox.

Virtually all the commands available are supported, but there is a problem. You must be quite familiar with GEM and XBIOS to use Toolbox, virtually requiring you to buy either the Atari ST Developer's Kit ($300) or some of the technical books now available. These sources tend to be incomplete, somewhat technical and not always accurate. Even something as essential as plotting a point or making a sound is accessible only through Toolbox from GEM or XBIOS.

Further, the manual included with SB is no help. It merely lists each Toolbox command with a cryptic description. Compare this to Optimized Systems Software's Personal Pascal, which not only includes GEM libraries, but spends about 150 pages telling you how to use its GEM support. Thus, unless you know that you must initialize GEM with a AppInit call followed by OpnVWkst and possibly a GrafHandle call, you cannot use the GEM support in SB at all. On the other hand, if you do know GEM, the Toolbox commands that closely match the actual GEM calls are superior to ST BASIC's "access-by-numbers" approach to VDI and AES.

Considerable speed advantages over ST BASIC, but not for the new programmer or novice

Another drawback of SB is that the manual is mostly for reference. This is no problem for an experienced BASIC programmer, as special features such as structured variables are thoroughly covered. However, the manual will not teach you to program in BASIC. Further, there are really no books teaching this particular BASIC, although a general book on MicroSoft BASIC will probably help.

As a compiled BASIC, Softworks BASIC has several advantages. It's fast, has structured variables, protects your source code and offers extensive GEM support. If you are a moderately experienced BASIC programmer, especially if you know some GEM and XBIOS, this is an excellent language. If you are just getting started, though, you should wait for the friendlier BASICs that are sure to come.

Softworks BASIC
Softworks Limited
2944 N. Broadway
Chicago, IL 60657
(312) 975-4030
$79.95

CIRCLE 202 ON READER SERVICE CARD

The Price War Is Over We Won!

We Will Beat Any Price...Anywhere.

Atari ST Hardware

Atari 520ST RGB	$785
Atari 520ST Mono	$645
Atari SF354	$149
Atari SF314	$208
Atari SM124	$165
Atari SC1224	$335
Supra Hard Disk	Call

Printers

Panasonic	Call
Star Micronics	Call
Citizen	Call

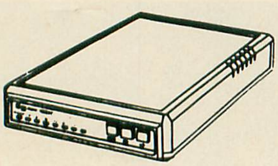
Modems

Avatex 1200	$79.00
QMI 1200ST	$129.00
Atari XM301	$35.99
Supra/MPP 1000E	Call

Specials

Avatex 1200	
PR Conn./Amodem	$149.00
Atariwriter Plus	$24.95
Avatex 1200	$79.00
Sakata SC100	$137.00
Teknika MJ-10	$178.00
Teknika MJ-22	Call
Habawriter	$25.00
Hippo C	$25.00
Hippo Eprom Burner	$99.99
Color Printer	Call

Avatex 1200
$79.00



Hayes Compatible! Everyday Low Price!

Atari ST Software

Borrowed Time	$29.95
Rogue	$24.95
Final Word	$85.99
Haba Software	Cheap
Hacker	$27.95
H & D Base	$65.00
H & D Forth	$35.00
H & D Toolbox	$25.00
PC Intercomm	$74.95
Personal Diskit	Call
Sundog	$24.95
VIP Professional	Call
Silent Service	$24.00
Flight Simulator	Call
Micro C Shell	$33.00
Mindshadow	$29.95
Print Master	$24.95
P.M. Art Gallery	$19.95
Easy Draw	$97.00
Graphic Artist	Call
Music Studio	$36.00
2Key Accounting	$32.99
Home Planetarium	$19.75
Joust	$19.75
CP/M Emulator	$32.99
Temple of Apshai	
Trilogy	$24.95
Metacomco Pascal	$69.95
Lattice C	$98.00
Andra	Call
UCSD Pascal	Call
Regent Spell	Call
Regent Word	$35.00
Regent Word II	Call
Regent Base	Call
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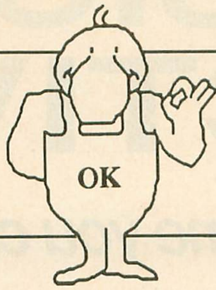
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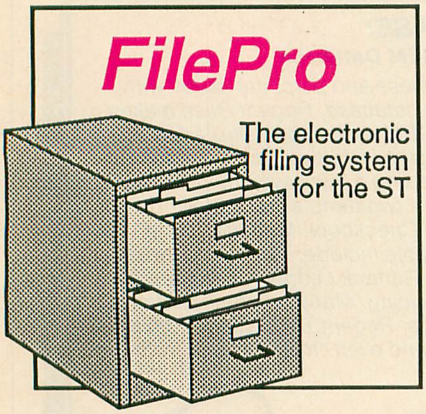
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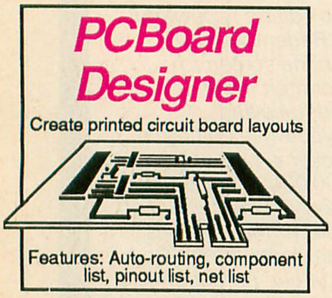
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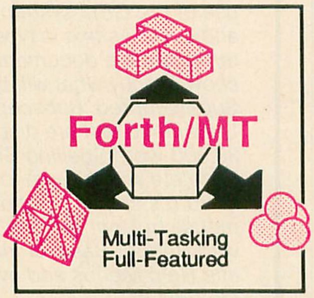
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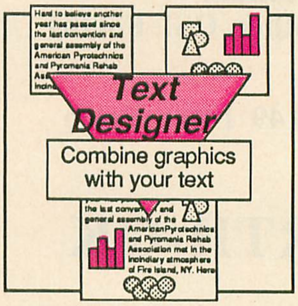
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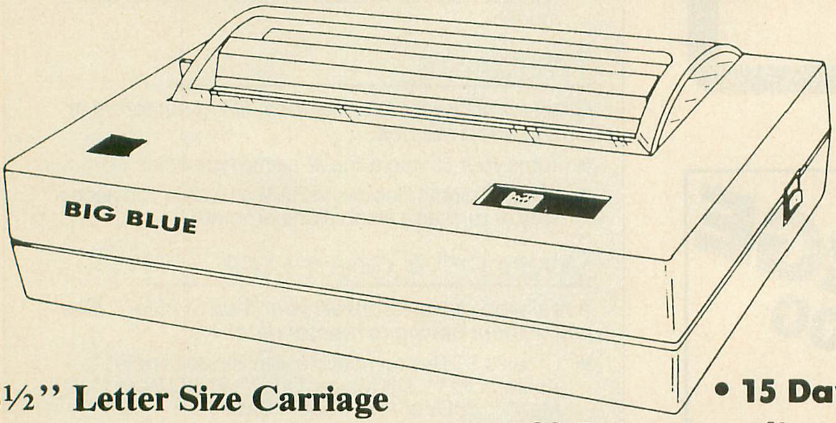
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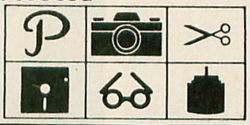
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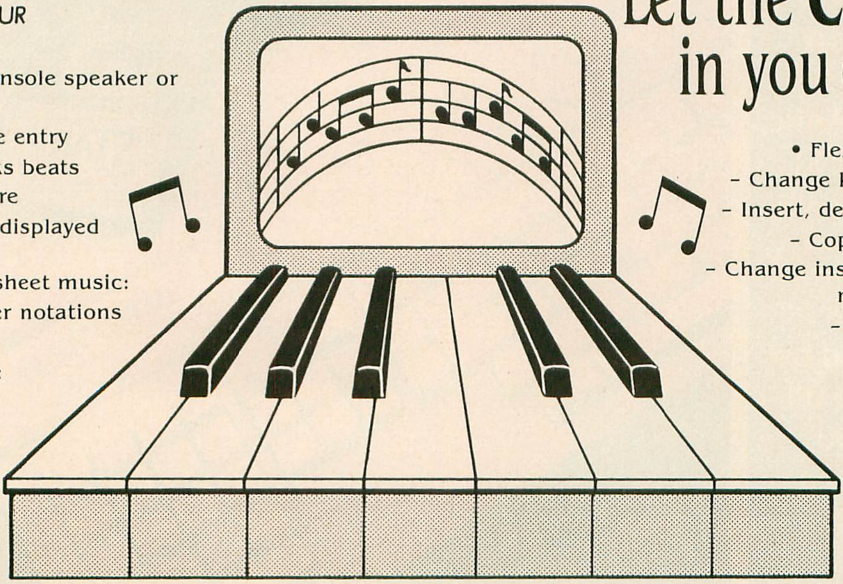
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But if computers are so smart, they should find the mistakes for you, right? What you need is to teach the computer to look at the program you just typed in, and have it tell you if you typed in any characters which aren't supposed to be there.

TYPO ST (Type Your Program Once ST), written in Atari ST BASIC, is the latest in the **Antic** tradition of providing automatic proofreading programs for checking our published BASIC listings. TYPO II currently does the job for the 8-bit listings.

How does the ST know when you've made a typing mistake? It can't, really. What it does is read your program line-by-line and add up the ASCII values for all the characters in each line. TYPO ST then prints out the line number it was looking at, and the *sum* of the values of all the characters in that line. This sum is called a ***checksum***. You compare this checksum against the line-number entry in the TYPO Table we will print at the end of each ST BASIC program.

TYPO ST reads through your saved ST BASIC listings and generates line-by-line proofreading codes

If the two values match, you've almost certainly typed the line correctly. (At present, TYPO ST can't tell if you *transposed* two characters that belong in the line.) If the values don't match, carefully check each character in the line and re-type as needed.

USING TYPO ST

To get started, type Listing 1, TYPOST.BAS, *carefully* into your ST and then SAVE it to disk. Feel free to use either the ST BASIC editor or the word processor of your choice. Me? I use 1st-Word Plus.

TYPO ST may now be used to check itself. When you have TYPO ST stored on disk, activate ST BASIC, (if you aren't using it already) and LOAD TYPO ST into memory. Either type RUN or go up to the file menu and click on RUN. In the output window, TYPO ST will ask for the name of the file to check. To have TYPO ST check itself, type in TYPOST.BAS and press [RETURN]. Next, TYPO ST will ask if you want the TYPO Table printed on the video Screen or the Printer. Type in S for the Screen or P for the Printer and press [RETURN].

TYPO ST will read through your saved TYPO ST program and generate the line-by-line TYPO codes for you to match against our TYPO Table. Remember, if the numbers don't match, check your typing on that line again.

PROGRAM TAKE-APART

Let's take a look at the TYPO ST program itself, just to see how it works. Starting at the top, Lines 1000-1050 are comments. Everything on a line *after* an apostrophe ['] is ignored by BASIC when the program is RUN. They are here to let us give the program a title, and author/copyright information.

Lines 1060 and 1070 set default values for variables, which here are easily-remembered names for different values, such as the word DISK standing in for the value 1. Line 1090

continued on next page

will **print** out the question asking which file to check, and then wait until you **input** (by typing) the desired filename. Lines 1100-1150 will stop and await your decision on which device (Screen or Printer) you wish the TYPO Table to be printed on. Lines 1140-1150 will re-confirm and print out your filename choice on the TYPO Table listing.

Line 1180 will open the disk file your program is saved in. This command is made up of four parts:

1. **open**, which is the command itself.

2. **"I",**, which stands for "input". Other choices here are "O" for output or "A" for append.

3. **#DISK,**, denoting the logical number of the device we want to communicate with. It's a good idea to keep this number between 1 and 31. Remember, we already told BASIC to set the variable DISK equal to 1.

4. **FILENAME$**, the variable where we previously told BASIC to store the letters making up the filename we want TYPO ST to check.

Lines 1200 through 1280 make up a collection of instructions to be executed only **while** a condition is TRUE. Here the condition is CHECKSUMMING, which was set TRUE back in line 1060. So we *will* be CHECKSUMMING, and control drops down to line 1210 where two variables, LINENUMBER and CHECKSUM, are reset to zero.

Why? Since the program will examine each line in turn and generate a checksum for it, we need to start off each line with a blank current LINENUMBER and blank CHECKSUM. If we didn't, the program might get confused and try to add in the last known CHECKSUM to the next line.

At line 1230, we instruct the computer to read in and process another line of your BASIC program. We call this process here GETALINE. Eventually we will have processed the current line, and the program will return and drop down to line 1250, where we transfer this line's CHECKSUM to a variable called DECIMAL, and then **gosub** to a routine called DECTOHEX, which will convert the base-10 decimal number in the variable DECIMAL into a base-16 number contained in the variables HI$ and LO$.

Line 1260 will build our final OUTPUT string of characters out of the current LINENUMBER, a space character followed by a colon character, and then the four characters HI$ and LO$ make up. Line 1270 will print the results on the device (video Screen or Printer) we asked for earlier in line 1110.

Line 1280 closes the **while... wend** loop we started in line 1200. Line 1300 will **close** the channel we **open**ed earlier in line 1180 to the DISK, and line 1310 is the logical **end** of the program.

Line 1340 is a label. ST BASIC allows the programmer to reference other lines by *name*, not just by number. Giving meaningful names to different subroutines helps the programmer remember what they do better than just referencing by line numbers. After all, GETALINE tells you what should happen better than just the number 1340.

Below, in line 1350, we erase BLINE$ by setting the variable to nothing (""). BLINE$ is where we will keep the entire line of BASIC code we will be summing up. We want to erase it so that we are sure to start with a fresh, clean line. After we erase BLINE$ we instruct BASIC what to do if we should encounter some sort of error while trying to read in each line of program from the disk. This instruction says, "If an error happens, transfer control to line number 1300."

Next, in line 1360, since we haven't quite yet gotten a line in from disk yet, we need to remember that by setting GOTALINE to FALSE. Line 1380 starts another **while... wend** loop which will indeed start **while** we have **not GOTALINE**. Below, in line 1390, we will **line input** a complete line from the disk file and put the lie into the variable called BLINE$. We use **line input** instead of just **input** , because line input will accept every character until the next carriage return, and we need to capture all the commas and punctuation contained in each line.

Line 1400 tests to see if BLINE$ has more than one character in it. If it does then we set GOTALINE to TRUE, because if BLINE$ has length, we have just GOTALINE. Line 1410 will force a loop until we have indeed GOTALINE.

Line 1430 will extract the current line number from BLINE$ by getting the **VAL**ue of BLINE$. The function **val( )** will accept all numeric characters in a row until it hits an alphabetic—or rather non-numeric—character. It then changes these numeric characters into a numeric value, which we place into LINENUMBER.

Line 1440 starts a **for... next** loop that will last for as many characters as the string BLINE$ has in it. This will allow us to examine each character in the string one after another. Line 1450 reminds us that we assume it's **OK** to add the value of CHARACTER$ into CHECKSUM. We then pull then next CHARACTER$ off BLINE$ and examine it. We test, in line 1470, to see if the character we just examined is a space character. If it is a space character we set OK to FALSE, meaning we do *not* want to add in the value to our CHECKSUM.

We do this because many people will want to type in BASIC programs with a word processor, and when ST BASIC gets its hands on the program it will strip away all the spaces between the line number and the first instruction. So we throw all spaces away. Finally, in line 1480, if the current CHARACTER$ is OK, we add in the ASCII value of CHARACTER$ to CHECKSUM, and then look for the **next** character in the line.

The last routine here is DECTOHEX, which will convert a base-10 number in DECIMAL to a base-16 number contained in HI$ and LO$. First, line 1540 makes sure we never slip DECTOHEX a negative number by forcing DECIMAL to its **absolute** value, which is positive. Line 1550 will break up the value DECIMAL into its HI and LO halves, and lines 1560-1570 further break down HI and LO into their own HI and LO halves.

Lines 1580-1590 do the hard work. These two lines change the base-16 value now in HH, HL, LH, and LL to their ASCII characters, and pair them off into two groups called HI$ and LO$

Listing on page 102

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Antic type-in listing section includes every full-length program from this issue. Listings are easier to type and proofread, easy to remove and save in a binder if you wish.

DISK SUBSCRIBERS: Programs for 8-bit Atari computers can be used immediately. Just follow instructions in the accompanying magazine articles. ST Owners: See monthly disk's ST Help File for instructions on how to transfer programs to 3-1/2 inch disk.

TYPING SPECIAL ATARI CHARACTERS

Antic printed program listings leave a small space between each Atari Special Character for easier reading. Immediately below you will see the way **Antic** prints all the standard Atari letters and numbers, in upper and lower case, in normal and inverse video.

ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
abcdefghijklmnopqrstuvwxyz
0123456789 0123456789

The Atari Special Characters and the keys you must type in order to get them are shown in the two boxes below.

NORMAL VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
♥	CTRL ,	●	CTRL T
	CTRL A		CTRL U
	CTRL B		CTRL V
	CTRL C		CTRL W
	CTRL D		CTRL X
	CTRL E		CTRL Y
	CTRL F		CTRL Z
	CTRL G		ESC ESC
	CTRL H	↑	ESC CTRL –
	CTRL I	↓	ESC CTRL =
	CTRL J	←	ESC CTRL +
	CTRL K	→	ESC CTRL *
	CTRL L	♦	CTRL .
	CTRL M	♠	CTRL ;
	CTRL N		SHIFT =
	CTRL O		ESC SHIFT CLEAR
♣	CTRL P	◀	ESC DELETE
	CTRL Q	▶	ESC TAB
	CTRL R		
	CTRL S		

INVERSE VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	人CTRL ,		人CTRL Y
	人CTRL A		人CTRL Z
	人CTRL B		ESC SHIFT DELETE
	人CTRL C		ESC SHIFT INSERT
	人CTRL D		ESC CTRL TAB
	人CTRL E		ESC SHIFT TAB
	人CTRL F		人CTRL .
	人CTRL G		人CTRL ;
	人CTRL H		人SHIFT =
	人CTRL I		ESC CTRL 2
	人CTRL J		ESC CTRL DELETE
	人CTRL K		ESC CTRL INSERT
	人CTRL L		
	人CTRL M		
	人CTRL N		
	人CTRL O		
	人CTRL P		
	人CTRL Q		
	人CTRL R		
	人CTRL S		
	人CTRL T		
	人CTRL U		
	人CTRL V		
	人CTRL W		
	人CTRL X		

Whenever the CONTROL key (CTRL on the 400/800) or SHIFT key is used, *hold it down* while you press the next key. Whenever the ESC key is pressed, *release* it before you type the next key.

Turn on inverse video by pressing the Reverse Video Mode Key . Turn it off by pressing it a second time. (On the 400/800, use the Atari Logo Key 人 instead.)

Among the most common program typing mistakes are switching certain capital letters with their lower-case counterparts—you need to look especially carefully at P, X, O and 0 (zero).

Some of Atari Special Characters are not easy to tell apart from standard alpha-numeric characters. Usually the Special Characters will be boxed. Compare the two sets of characters below:

SPECIAL			STANDARD		
		CTRL F	/		/
		CTRL G			SHIFT +
		CTRL N	—		SHIFT -
		CTRL R	-		–
		CTRL S	+		+

HOW TO USE TYPO II

TYPO II is the improved automatic proofreading program for **Antic's** type-in BASIC listings. It finds the exact line where you made a program typing mistake.

Type in TYPO II and SAVE a copy to disk or cassette. Now type GOTO 32000. When you see the instruction on the screen, type in a single program line **without the two-letter TYPO II code** at left of the line number. Press [RETURN].

Your line will reappear at the bottom of the screen with a two-letter TYPO II code on the left. If this code is not exactly the same as the line code printed in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk [*] followed (without in-between spaces) by the line number, then press [RETURN]. When the complete line appears at the top of the screen, press [RETURN] again. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME",0,31999 [RETURN] (Cassette owners LIST "C:). Type NEW, then ENTER "D:FILENAME" [RETURN] (Cassette—ENTER "C:). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

Owners of the BASIC XL cartridge from O.S.S. type SET 5,0 and SET 12,0 before using TYPO II.

LISTING 1

Don't type the TYPO II Codes!

```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
   SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "↖":POSITION 11,1:? "TYPO II "

EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
ET 32120 ? "↖":POSITION 11,1:? " TYPO II 
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
VV 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
   ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
   (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press  RETURN  and edit line a
   bove.":GOTO 32050
```

TECH TIPS

Here are two pleasing graphics demonstrations for the 8-bit Atari. Listing 1, VISIONS.BAS, was sent to **Antic** by Michael Metz of St. Clair, Michigan. Michael, 17, describes himself as a computer graphics "freak" who has enjoyed programming his Atari since he was 14.

```
ZZ 1 REM VISIONS
PW 2 REM BY MICHAEL METZ
VF 10 GRAPHICS 9:FOR I=1 TO 79
DI 20 C=C+1:IF C>15 THEN C=1
UB 30 SETCOLOR 4,C,0:COLOR I/2.5
FQ 40 PLOT I,X:DRAWTO 79-I,X
ID 50 PLOT I,190-X:DRAWTO 79-I,190-X
IY 60 PLOT 79-I,X:DRAWTO I,190-X
PS 70 PLOT 79-I,190-X:DRAWTO I,X
RH 80 X=X+1:IF X>190 THEN X=0
IX 90 NEXT I
AM 100 FOR D=1 TO 700:NEXT D:GOTO 10
```

Listing 2, RAINBOW.BAS, comes from the newsletter of the Salt Lake City Atari Computer Enthusiasts (ACE). You don't need to type in the lines numbered 200 and above. They are there to show the changes to make on lines 30, 50 and 70 if you have an XL or XE computer to take advantage of Graphics 15 which is unavailable on the older machines.

```
BE 10 REM RAINBOW
MD 20 REM ACE OF SALT LAKE
OX 30 GRAPHICS 7+16:COLOR 3
LP 40 FOR X=0 TO 159 STEP 8
SF 50 PLOT 0,0:DRAWTO X,95
NZ 60 NEXT X
DF 70 FOR Y=95 TO 0 STEP -8
RU 80 PLOT 0,0:DRAWTO 159,Y
OL 90 NEXT Y
CF 100 FOR I=0 TO 21:READ A:POKE 1536+I,A
   :NEXT I
YI 110 A=USR(1536)
SA 120 DATA 173,11,212,201,32,208,249,141
   ,10,212,142,24,208,232,232,208,246,142

PF 130 DATA 24,208,240,232
NY 140 END
UE 200 REM CHANGE LINES 30, 50 AND 70 TO
   THE FOLLOWING IF YOU HAVE AN XL OR XE

QU 210 REM 30 GRAPHICS 15+16:COLOR 3
IR 220 REM 50 PLOT 0,0:DRAWTO X, 191
JA 230 REM 70 FOR Y=191 TO 0 STEP -8
```

continued on next page

eye-catching horizontal display

TEXT SIDEWINDER

Article on page 19

LISTING 1

Don't type the TYPO II Codes!

```
SI 2 REM TEXT SIDEWINDER
ST 3 REM BY JESS ENGELHART
FS 4 REM (c) 1986, ANTIC PUBLISHING
NF 5 GRAPHICS 0:? "MODE (0, 1 OR 2)";:INP
   UT MODE:IF  NOT (MODE=0 OR MODE=1 OR M
   ODE=2) THEN 5
QM 10 GOSUB 600:GOTO 1000
XB 50 IF PEEK(764)<>33 THEN 60
YQ 55 TIME=TIME-10:IF TIME<10 THEN TIME=1
   50
JZ 60 ? TIME:POKE 764,255:FOR R=0 TO TIME
   :NEXT R:RETURN
XK 600 GRAPHICS MODE:POKE 752,1:? "}":POS
   ITION 1,1:? #6;"PRESS SPACE BAR TO  AL
   TER BANNER speed"
LE 610 POKE 703,4:REM CREATE A TEXT WINDO
   W IN GR.0
OL 620 DIM A$(2500),UU$(120),VV$(120),WW$
   (120),YY$(120),ZZ$(120):RESTORE 4000:R
   EAD A$,UU$,VV$,WW$,YY$,ZZ$
QU 625 A$(LEN(A$)+1)=UU$:A$(LEN(A$)+1)=VV
   $:A$(LEN(A$)+1)=WW$:A$(LEN(A$)+1)=YY$:
   A$(LEN(A$)+1)=ZZ$
XU 630 TIME=150:LL=19:POSITION 3,8:? #6;"
   ANTIC BACK then"
GD 640 IF PEEK(87)=0 THEN LL=38:REM IF GR
   .0 THEN LL=38
RG 645 GOSUB 50:RETURN
TG 1000 REM BANNER PRINT ROUTINE 1000 TO
   1500
JT 1001 FOR P=0 TO LL:POSITION LL-P,8:? #
   6;A$(1,P+1):GOSUB 50:NEXT P:POKE 77,0
HU 1010 FOR P=P+1 TO (LEN(A$)):POSITION 0
   ,8:? #6;A$(P-LL,P):GOSUB 50:NEXT P
IW 1012 A$(LEN(A$)+1)=CHR$(32)
JM 1015 FOR Q=P-(LL+1) TO P:POSITION 0,8:
   ? #6;A$(Q,P):GOSUB 50:NEXT Q
MU 1020 GOTO 1000
TB 4000 DATA FOR ANTIC IT ALL STARTED ON
   A kitchen table IN jim capparell's POT
   RERO HILL APARTMENT IN SAN FRANCI
ZC 4002 DATA SCO. "WHEN JIM SAID 'HEY! LE
   T'S START A MAGAZINE!' I SAID 'SURE. W
   HY NOT?' RECALLS marni tapsco
KM 4004 DATA tt (antic's CO-FOUNDER AND A
   RT DIRECTOR. "I WOULD NEVER HAVE IMAGI
   NED THEN THAT TODAY -- FOUR YEA
TG 4006 DATA RS LATER -- I'D BE MAKING A
   REAL salary."  "marni SUGGESTED A COMP
   UTER NAME SUCH AS byte." SAY
AE 4008 DATA S capparell.  "SO THAT GOT M
   E THINKING ABOUT COMPUTER STUFF AND OU
   T POPPED ANTIC -- SHORT FOR al
AG 4010 DATA pha numeric telivision integ
   rated circuit -- ONE OF THE 8-BIT ATAR
   I SPECIAL CHIPS.
```

rubber visuals in action!

VIDEO STRETCH

Article on page 37

LISTING 1

```
;STRETCH
;BY LLOYD BURCHILL
;(c) 1986, ANTIC PUBLISHING

Module

byte key=764,IR
card scr=88,dlist=560

define dlspace="14592"
define dlsend= "14592 +575"
 ;a 580 byte long space is needed
 ;that includes no addresses on
 ;a 1K boundary
 ;(excepting first byte)

card array memline(192)

Proc Stretch(card lines,card vstart)

;Parameters:
;'lines' is number of scan lines the image sh
ould occupy on the screen
;'vstart' is scan line of original image that
 will appear at top of screen

Byte pointer p
card pointer q
card bigline,addr,inc,temp

inc=24576/lines

bigline=(inc rsh 1)+(vstart lsh 7)

p=dlspace+3
q=dlspace+4

do

 temp=bigline rsh 7
 addr=memline(temp)
 p^=IR+64
 p==+3

 q^=addr
 q==+3

 bigline==+inc
 if bigline>24576 or p>dlsend then exit fi

od
```

```
p^=65

Return


Proc Sinit()          ;initialize
card a

setblock(dlspace,3,112)

for a=0 to 191 do
memline(a)=scr+a*40 od
;change to 'a*20' to use mode 14

stretch(192,0)
dlist =dlspace

Return


Proc Load()           ;load disk picture
byte pointer p

Close(5)
Open(5,"D1:PICTURE",4,0)

for p=scr to  scr+7679
do
 p^=GetD(5)
od

 p=712
 p^=GetD(5)

for p=708 to  710
do
 p^=GetD(5)
od

Close(5)

Return


Proc Drawing()        ;example picture
byte t,u,v,w,x,y,z

for w=0 to 30
do
 color=rand(16)
 x=rand(76)
 y=rand(180)
 for z=0 to 3
  do
  Plot(x+z,y) Drawto(x+z,y+12)
  od
od

for x=0 to 14
do
 color=x+1
 Plot(0,x) Drawto(79-x,95) Drawto(0,191-x)
 Plot(0,29-x) Drawto(52+x,95) Drawto(0,163+x)

od

for w=0 to 15
do
 z=10+ rand(70)
 y=rand(192-z)
 u=rand(20)
 v=rand(50-u)+15
 t=10+rand(21)

 for x=0 to 14
 do
  color=(15-x)*t/30
  Plot(v-x,y+z)
  Drawto(v-10+u,y)
  Drawto(v+x,y+z)
 od
od

Return


Proc Rubber_Band() ;main procedure
byte pad1=624,pad2=625,mode
card h

do
   IR=15
   ;use 15 for modes 8,9,10,11
   ;use 14 for mode 15, "graphics 7 1/2"
   ;use 12 for mode 14  (160 x 192 x 2 colors
)

  Graphics(0)
  Poke (752,1)
  PrintE ("Load your own picture")
  PrintE ("Demo mode")

  do
     until key=0 OR key=58
  od
  mode=key
  Poke(764,255)

   if mode=58 then
     Graphics(9) Poke(712,128)
     Drawing()

   elseif mode=0 then
     Graphics(8) Poke(712,128)
     IR=14
     Load()
   fi

  ;Use either Load() or Drawing()
  ;and adjust graphics call
  ;according to preference

  Sinit()
  do

   h=pad1

   if pad2<192 then
    Stretch(h lsh 1 ,pad2)
   fi

  until key<>255
  od

until 0=1
od

Return
```

game of the month

SSSNAKE!!!

Article on page 23

LISTING 1

Don't type the TYPO II Codes!

```
PW 1 REM SSSNAKE
EU 2 REM BY CHET WALTERS
FR 3 REM (c) 1986, ANTIC PUBLISHING
IV 10 GOTO 4000
UY 20 IF PEEK(53279)=N6 THEN 2000
HO 25 S=STICK(0):IF PEEK(KEY)<>TFF THEN P
   OKE KEY,TFF:GOSUB 700
TV 30 X=X+STX(S):IF X>ETN THEN X=ETN:GOSU
   B 500
ZN 35 IF X<N THEN X=N:GOSUB 500
NF 40 Y=Y+STY(S):IF Y>20 THEN Y=20:GOSUB
   500
AL 45 IF Y<N THEN Y=N:GOSUB 500
```

continued on next page

```
RV 50 NPOS=SCR+X+20*Y:BYTE=PEEK(NPOS):IF ENG<=0 THEN 70
US 60 IF BYTE THEN GOSUB 200
QP 70 POKE NPOS,HEAD(5):POKE TRACK(H-N),BODY:POKE TRACK(T),TAIL:POKE TRACK(T-N),0:TRACK(H)=NPOS:TAIL=106
EM 75 FONT=FONT+N-4*(FONT=N3):IF FONT=0 OR FONT=N2 THEN POKE CHP,CHSET+FONT
IT 80 H=H+N:IF H>TMAX THEN H=TMIN:TRACK(H-N)=TRACK(TMAX)
HA 85 T=T+BT:BT=N:IF T>TMAX THEN T=TMIN:TRACK(T-N)=TRACK(TMAX)
QL 90 POKE VF,0:IF BTN>=FTN THEN BTN=FTN:GOSUB FINIS
HE 95 IF ENG<=0 THEN S=5:GOTO THUNDER
UX 100 IF STICK(0)=FTN THEN GOSUB 400
KO 110 IF PEEK(BLF)>N3 THEN 20
ED 120 POKE VF,WEAK:ENG=ENG-E-(4-FNC):IF WEAK<197 THEN GOTO 130+5*(WEAK=36)
XW 125 IF ENG<=250 THEN WEAK=196:POKE VVD,DIS:FOR I=0 TO 75:POKE VF,I:NEXT I:POKE SNK,WEAK:POKE VVD,PUR
SB 130 IF ENG<FTY THEN WEAK=N6*N6:POKE SNK,WEAK
YZ 135 POSITION 0,23:? #N6;ENG;" ";:POKE VF,0:GOTO 20
KI 200 REM SCORING ROUTINE
ZT 205 POKE VF,BYTE:IF BYTE=BUG-64 THEN GOSUB 270:POKE NPOS,BYTE:GOTO 260
LA 210 IF BYTE=BM OR BYTE=BUG THEN 265
AW 215 IF BYTE=BODY THEN GOSUB 540:GOSUB 270:GOSUB 300:POKE SNK,WEAK:TAIL=BUG:RETURN
AM 225 IF BYTE=TAIL THEN POKE VF,20:BT=0:BTN=BTN-(BTN>-TN):BYTES=BYTES+BYTE:BYTE=GM
IM 230 IF BYTE=DROP THEN DRY=DRY-N:IF DRY=0 THEN POKE BLF,TRQ:GOSUB 270:POP :GOTO 600
LM 235 IF BYTE=GM THEN POKE BLF,BLU:POKE DLC,GRN:POKE SNK,WEAK:POKE SHT,TRQ
WR 240 BYTES=BYTES+BYTE+E:POSITION 12,23:? #N6;BYTES;" ";
EE 250 IF BYTES>FS THEN FS=FS+9999:GOSUB 270:GOTO 900
ZX 255 RETURN
RG 260 POKE VVD,DIS:FOR I=N TO 100:POKE VF,I:POKE VF,GM:POKE SHT,I:NEXT I:ENG=INT(ENG/N2):POKE VVD,PUR
HK 265 POKE BLF,RED:POKE DLC,RED:GOSUB 400:BT=BT+(FNC<N2):BTN=BTN+(FNC<N2):TAIL=BYTE:POKE BLF,N2:RETURN
CS 270 POKE NPOS,HEAD(5):POKE TRACK(H-N),BODY:RETURN
CT 300 REM MAKE IT 300
CA 305 POKE 77,0:GOSUB 400:POKE VVD,DIS:FOR I=0 TO FNC+TN-DIFF:SETCOLOR 3,PEEK(20),N6
BW 310 B=PEEK(R):POKE VF,B:A=SCR+393*RND(0)+TT:IF PEEK(A) THEN 310
RP 315 IF BYTE=BODY THEN POKE SNK,RED
DW 320 POKE VF,0:POKE A,DROP:DRY=DRY+N:NEXT I:IF CLEAN THEN SETCOLOR 4,B,4
MQ 325 POKE VVD,PUR:ENG=ENG-5:IF PEEK(DLC) THEN POSITION 0,TT+N:? #N6;ENG;" ";
OZ 400 REM PUT IN SOME HAZARDS
OB 410 POKE VF,30:A=SCR+418*RND(0)+19:IF PEEK(A)=N3 OR PEEK(A)=DROP THEN 410
ID 415 ON 23*RND(0) GOTO 430,420,450,440,470,430,420,460,430,440,440,430,470,440,460,440,470,480,470,420,440,460
UB 420 POKE A,WRM:RETURN
XU 430 POKE A,BM:RETURN
AE 440 POKE A,GM:RETURN
JD 450 ERASE=SCR+418:POKE ERASE,TAIL:RETURN
IY 460 POKE A,BUG:RETURN
OC 470 POKE ERASE,BUG-64:RETURN
TS 480 ERASE=A:POKE A,TAIL:RETURN
WE 500 REM HIT FENCE AND END CHECK
KU 510 IF ENG<=0 OR NPOS>SCR+419-FONT THEN GOSUB FINIS+CLEAN:ENG=0:POKE NPOS,0:GOTO 545
DM 520 IF WEAK=N6*N6 OR STICK(0)=FTN THEN RETURN
PW 525 IF FNC THEN POKE VF,200:POKE NPOS,0:GOSUB 400:GOTO 530+TN*FNC
OF 530 POKE VVD,DIS:FOR I=N TO TN:POKE SNK,14:POKE SNK,0:POKE VF,70:NEXT I:GOSUB 300:POKE VF,0
FP 540 BTN=BTN+N:BT=N2:TAIL=BM
WV 545 B=PEEK(R):POKE VF,B:SETCOLOR 1,B,N8:IF Y=20 AND X=ETN THEN OVER=OVER+N:GOTO 560
PG 550 POKE VF,0:POKE VVD,PUR:RETURN
HV 560 IF OVER>42-BTN THEN OVER=0:FS1=FS1+CLEAN:POKE SHT,TRQ:GOTO 570
AC 565 RETURN
FJ 570 FS1=FS1-N*(FS1>N):IF FS1=N THEN POKE VVD,PUR:FOR I=N TO 200:POKE VF,I:POKE VF,I+TN
OK 571 POKE BLF,I:NEXT I:GOTO 2000
RG 575 FS$(LEN(FS$)+CLEAN)="":IF  NOT DIFF AND FNC=N THEN PRESS=26:GOTO 595
KK 580 IF  NOT DIFF AND FNC=N2 THEN PRESS=30:GOTO 595
WE 581 IF  NOT (FNC OR DIFF) AND CLEAN THEN POKE DLC,0:GOTO 1010
LJ 585 GOTO 3000
LN 590 BOP=BOP+DBL*(ENG+(10*FTN-BTN)):BYTES=BYTES+BOP:FINIS=591:ENG=0
ZW 591 RETURN
ZZ 592 RETURN
XX 595 POKE DL+24,132:POSITION 0,0:? #N6;"■";:GOTO 2065
RS 600 REM ATE ALL RAINDROPS BONUS
IX 605 GOSUB FINIS:IF WEAK>197 THEN DBL=N2:GOTO 670
PX 610 DIS=PUR:POKE DLC,0:SNK=SKR:FOR CLEAN=FTN TO N2 STEP -N:GOSUB 300:NEXT CLEAN:POKE DLC,GRN
FV 615 DIS=202:GOSUB THUNDER:POKE BAK,0:POKE BLF,BLU:POKE CHP,CHSET:SNK=711:POKE SKR,20*N2
CH 620 FOR I=SCR TO SCR+439:POKE VF,PEEK(I)+TN:POKE SHT,PEEK(20)
KH 625 BOP=BOP+E+(INT(PEEK(I)/N6))*DBL:POSITION FTN,TT:? #N6;BOP;
EJ 630 IF PEEK(I) THEN POKE I,N8*RND(0)+97
ZU 640 POKE VF,0:NEXT I:BYTES=BYTES+BOP:POSITION TN+N,20+N3:? #N6;"        ";
SK 650 POKE DLC,GRN:DIFF=DIFF-N*(DIFF>0):POKE SHT,200+N2:BODY=TAIL
HA 660 FOR I=230 TO TN STEP -N6:POKE VF,I+FTN:POKE VF,I+TN:POKE VF,I:NEXT I:GOSUB 240:GOTO 30
DL 670 FOR I=230 TO TN STEP -N6:POKE VF,I+FTN:POKE VF,I+TN:POKE VF,I:NEXT I
WT 680 POSITION 0,TT+N:? #N6;"   double bonus████d";:POKE VVD,DIS:WEAK=197:FOR I=N TO FTY:NEXT I:REM >CNTRL<"A"
NS 685 FOR I=150 TO 0 STEP -N:POKE VF,I+TN:POKE VF,I:POKE SHT,I:NEXT I
CB 690 POKE SHT,TRQ:GOTO 610
LZ 700 REM PAUSE ROUTINE
JA 710 POKE VF,0:I=PEEK(DLC):POKE DLC,0:POKE DL+26,134
SP 720 POSITION 0,TT:? #N6;"   press trigger ";
OK 730 IF STRIG(0) THEN POSITION N3,TT:? #6;"PRESS TRIGGER":GOTO 720
LL 740 POSITION N3,TT:? #N6;"              ";:POKE DLC,I:POKE DL+26,N6:POKE 77,0:POSITION 0,TT:? #N6;FS$;
PJ 750 POKE KEY,TFF:RETURN
ZX 800 REM  ROUND OVER, MAKE THUNDER 
IS 810 GOSUB FINIS:GOSUB 250:THUNDER=30:POKE DL+26,134:POSITION 0,TT:? #N6;"LIVES ";FS1-N2+CLEAN;
QE 815 ? #N6;" BONUS ";ABS(BOP):? #N6;"    BYTES ";BYTES;" ";:IF CLEAN THEN 850
TG 820 POKE DLC,RED:POKE 20,0:POKE VVD,DIS1:FOR I=N TO 30:POKE BAK,PEEK(R):POKE VF,PEEK(20):NEXT I:POKE VVD,DIS
MK 825 FOR I=175 TO 200:POKE VF,55*RND(0)+I:SOUND N,PEEK(20),N8,TN:SOUND N2,I+50,N8,TN:POKE VVD,DIS1
CV 830 POKE VF,TFF:POKE BAK,PEEK(R):NEXT I:POKE BAK,0:POKE 20,RED:FOR I=100 TO 0 STEP -0.5:POKE VF,PEEK(20)
MV 835 POKE BLF,I:POKE VVD,I:POKE BLF,BLU:NEXT I:POKE VVD,DIS:FOR I=N TO N3:SOUND I,0,0,0:POKE VF,PEEK(20):NEXT I
VO 840 POKE VF,0:GOTO 30
JQ 850 POKE SKR,40:POKE BAK,0:FOR I=SCR+448 TO SCR+459:POKE I,75*(I<SCR+457):FOR DLY=0 TO TN:POKE VF,PEEK(20)
ER 855 NEXT DLY:POKE 20,PEEK(R):NEXT I:POSITION 9,TT:? #N6;"bonus■  ";:RETURN :
```

```
   REM >CNTRL<"K"
JV 900 REM FREE SNAKE ROUTINE
IU 910 FS1=FS1+N:IF FS1>TN THEN FS1=TN:GO
   TO 950
QJ 915 POSITION 0,TT:? #N6,"              ";:PO
   KE SCR+458,0:POKE VVD,PUR
WT 920 FOR I=80 TO 61 STEP -N:POKE VF,I:R
   OT=PEEK(SKR):POKE SKR,PEEK(SHT):FOR DL
   Y=N TO N2:POKE VF,PEEK(20)
BJ 925 NEXT DLY:POKE SHT,PEEK(BLF):POKE B
   LF,PEEK(SNK):POKE SNK,PEEK(DLC):POKE D
   LC,ROT:NEXT I:POKE VF,0
RO 930 FS$(LEN(FS$)+N)="d":POSITION 0,TT:
   ? #N6;FS$:IF CLEAN THEN POSITION 0,TT:
   ? #N6;"     free snakeHHHH";
AD 940 RETURN :REM >CNTRL<"A"
FO 950 IF CLEAN THEN FOR I=THD TO 0 STEP
   -N3:POKE VF,I:NEXT I
LC 955 POKE VF,0:POSITION 0,TT:? #6;"maxi
   mum ■ lives";:RETURN
UZ 960 FOR ST=0 TO TN:FOR I=0 TO TFF STEP
    64:POKE SCR+448,36+I:POKE VF,I:NEXT I
   :NEXT ST
ZT 970 RETURN
VH 1000 REM COMPLETED LEVELS BONUS
HC 1010 E=E+N2*(E<20):BOP=E*250:BYTES=BYT
   ES+BOP:POKE DL+N8,134:? #N6;"■"
AS 1011 POSITION N2,N6:? #6;"congratulati
   ons":POKE 85,N8:? #N6;"you"
LL 1015 POKE VF,PEEK(20):POKE 85,N6:? #6;
   "made it":POSITION N6,20:? #N6;BYTES:?
    #N6:? #6;"    press trigger"
XO 1016 POSITION 5,12:? #N6;"bonus ";BOP:
   POKE SCR+RND(I)*400,10
SH 1020 POKE SHT,PEEK(20):POKE VF,PEEK(R)
   :IF STRIG(0) THEN 1011
FT 1025 POKE DL+N8,N6:PRESS=26:POKE SHT,B
   LU:GOTO 595
EC 2000 REM NEW GAME & TITLE ROUTINE
PQ 2005 POP :SCR=PEEK(88)+TFX*PEEK(89):FN
   C=0:CLEAN=0:ENG=250:E=0:POKE SHT,TRQ
BR 2010 FS$=" dd":FS=9999:FS1=4:DIFF=TN-N
   3:POSITION 0,0:POKE SNK,GRN+N6:POKE DL
   C,0:POKE BAK,0
CH 2015 POKE DL+24,134:POKE 16,64:POKE 53
   774,64:POKE BLF,BLU:POKE CHP,CHSET+N2:
   IF BYTES>HI THEN HI=BYTES
PT 2020 ? #N6;"■":IF BYTES THEN POSITION
   0,TT:? #N6;"hi score        bytes":? #N6;
   HI:POSITION TN+N3,TT+N:? #N6;BYTES;
BW 2025 FOR I=1561 TO 1757 STEP N2:COLOR
   ASC("e"):PLOT PEEK(I-N),PEEK(I):COLOR
   ASC("■"):PLOT PEEK(I-N3),PEEK(I-N2)
GT 2030 IF I>1746 THEN COLOR ASC("j"):PLO
   T PEEK(I-187),PEEK(I-186):A=SCR+128:PO
   KE VF,GM:POKE A,WRM:POKE A+2,BM
RB 2035 IF I>1748 THEN COLOR 0:PLOT PEEK(
   I-189),PEEK(I-188):PLOT 0,0:POKE A+20,
   GM:POKE VF,BM:POKE A+TT,BUG
AB 2040 POKE VF,PEEK(I)+N8:NEXT I:GOSUB 3
   00:POSITION N,20+N:? #N6;"HIT KEY> 1 2
    OR 3";
MQ 2045 RESTORE 5105:FOR I=N TO 500:PRESS
   =PEEK(KEY):IF PRESS<>TFF THEN POP :BYT
   ES=0:POSITION 0,20:GOTO 2065
PI 2050 FONT=FONT+N:IF FONT>N3 THEN FONT=
   -N:POSITION 0,20:? #N6;"choose  entry
   stage";:READ A:POKE VF,A+N8
QO 2055 IF FONT=0 OR FONT=N2 THEN POSITIO
   N 0,20:? #N6;"CHOOSE  ENTRY STAGE";:PO
   KE VF,0:POKE CHP,CHSET+FONT
LB 2060 NEXT I:GOTO 2020
XX 2065 ? #6;"                    ";:POSIT
   ION 0,20+N2:? #6;"                    "
   ;:POSITION N,20+N:POKE DLC,0
NW 2070 POKE KEY,TFF:IF PRESS=31 THEN FNC
   =N2:? #N6;"  HARMLESS FENCE   ";:GOTO 2
   090
ZX 2075 IF PRESS=30 THEN FNC=N:? #N6;" SH
   RINKING SNAKE! ";:GOTO 2090
NI 2080 IF PRESS=26 THEN FNC=0:? #N6;"FEN
   CE ELECTRIFIED!";:GOTO 2090
ER 2085 ? #N6;"hit only 1 2 or 3  ";:POKE
    DLC,RED:FOR I=N TO 20:POKE VF,PEEK(20
   ):NEXT I:POKE DLC,0:GOTO 2045
EY 2090 FOR I=TFF TO 0 STEP -N:POKE VF,I:
   POKE VF,PEEK(20):POKE BLF,I:NEXT I:POK
   E DL+24,N6:DIFF=N6-N
BI 3000 REM DRAW FENCE AND GO
BQ 3010 H=20:T=4:BTN=0:DRY=0:CLEAN=0:BOP=
   0:THUNDER=800:ERASE=SCR+418:POKE BLF,T
   RQ:POKE DLC,0:POKE 84,0:? #6;"■"
IL 3015 COLOR 35:PLOT 0,0:DRAWTO 20-N,0:D
   RAWTO 20-N,20:PLOT 20-N3,20+N:DRAWTO 0
   ,20+N:DRAWTO 0,0:POKE VVD,PUR
WJ 3020 POKE DL+26,N6:POSITION 0,TT:? #6;
   FS$:POKE 85,(DIFF>N):? #6;" STAGE>";N3
   -FNC;" LEVEL>>>>";N6-DIFF;
GL 3025 POKE 20,0:FOR I=SCR+TT TO SCR+400
    STEP 24:FOR A=N TO N8:POKE VF,PEEK(20
   ):NEXT A:POKE VF,DROP
DZ 3030 POKE I,BM:NEXT I:POKE BLF,BLU:FOR
    ST=N TO N8-FNC:GOSUB 300:NEXT ST:ENG=
   250+5*(5-DIFF)+FTY*(3-FNC)
EF 3035 FOR I=0 TO TN-DIFF:POKE VF,PEEK(R
   ):GOSUB 400:NEXT I:POSITION 0,TT+N:? #
   N6;ENG;"    BYTES ";BYTES;" ";
DV 3040 FOR I=100 TO 0 STEP -N:TRACK(I)=S
   CR+21:POKE VF,I+TN:POKE VF,I:NEXT I:PO
   KE VF,TN:WEAK=GRN+N6:POKE SNK,WEAK
IN 3045 POKE DLC,GRN:POKE TRACK(1),0:X=0:
   Y=0:DBL=N:S=5:FINIS=590:BODY=233:POKE
   SCR,N3+64*FNC:GOTO 30
HT 4000 REM ONE-TIME INITIALIZATIONS
LC 4005 N=1:N2=2:N3=3:N6=6:N8=8:TN=10:FTN
   =15:ETN=18:TT=22:FTY=50:THD=200:TFF=25
   5:TFX=256
YM 4010 RED=48:BLU=150:GRN=194:TRQ=202:DL
   C=1546:DROP=12:BM=171:BUG=172:WRM=60:G
   M=50
AY 4015 TMAX=100:TMIN=N:DIM FS$(20),HEAD(
   FTN),TRACK(100):HEAD(14)=97:HEAD(6)=98
   :HEAD(7)=99:HEAD(5)=100:HEAD(13)=101
BZ 4020 HEAD(9)=102:HEAD(11)=103:HEAD(TN)
   =104:HEAD(FTN)=100:BODY=233:TAIL=106
AN 4025 DIM STX(FTN):STX(14)=0:STX(13)=0:
   STX(9)=-N:STX(TN)=-N:STX(11)=-N:STX(5)
   =N:STX(FTN)=N:STX(6)=N:STX(7)=N
EI 4030 DIM STY(FTN):STY(11)=0:STY(7)=0:S
   TY(6)=-N:STY(TN)=-N:STY(14)=-N:STY(5)=
   N:STY(FTN)=N:STY(9)=N:STY(13)=N
MA 4035 KEY=764:CHP=756:SKR=708:SHT=709:B
   LF=710:SNK=711:BAK=712:R=53770:VF=5376
   0:VVD=53761:PUR=170:DIS=202:DIS1=138
SP 5000 REM SET UP DLI & REDEFINED CHARAC
   TERS
JA 5010 POKE 106,PEEK(740)-5:GRAPHICS 18:
   CHSET=(PEEK(106)+N)*TFX
LP 5015 POSITION 4,N2:? #N6;"sssnakecccc
   ":REM INVERS >CNTRL< "A"
BU 5020 POSITION N8,4:? #N6;"BY":POSITION
    4,N6:? #N6;"chet walters":POSITION 5,
   N8:? #N6;"FOR ANTIC":POKE BAK,RED
CL 5025 FOR I=1536 TO 1551:READ Y:POKE I,
   Y:NEXT I:POKE VVD,PUR
SL 5030 FOR I=1557 TO 1758:READ Y:POKE I,
   Y:POKE VF,Y:SOUND N,PEEK(R),TN,TN:POKE
    SNK,Y:NEXT I
LI 5035 RESTORE 5110
TJ 5040 READ X:X=X*N8:IF X<0 THEN POKE VF
   ,0:SOUND N,0,0,0:GRAPHICS 17:GOTO 5075
UR 5050 FOR Y=0 TO 7:READ A:SOUND 0,A,TN,
   TN:SOUND N,PEEK(R),TN,TN:POKE CHSET+X+
   Y,A:POKE SNK,A:NEXT Y:GOTO 5040
JN 5075 DL=PEEK(560)+TFX*PEEK(561):POKE D
   L+27,134:POKE 512,0:POKE 513,N6
WI 5080 POKE 54286,192:CHSET=CHSET/TFX:GO
   TO 2000
JY 5100 REM DL SERVICE ROUTINE
GX 5101 DATA 72,169,224,141,10,212,141,9,
   212,169,0,141,26,208,104,64
BR 5102 REM START DISPLAY & TRACK DATA
BY 5103 DATA 0,0,0,0,1,1,2,2,3,3,4,4,4,4,
   3,3,2,2,2,1,3,1,4,1,5,1,6,1,7,2,8,3,8,
   4,9,4,10,4,11,4,12,4,13,4,14,4,15,3
IS 5104 DATA 16,2,16,1,15,1,14,1,15,5,12,
   6,13,6,14,6,15,6,16,6,15,6,14,6,13,6,1
   2,7,11,8,12,8,13,8,14,8,15,8,16,9,16
CD 5105 DATA 10,15,10,14,10,13,11,12,12,1
   2,13,13,13,14,13,15,12,16,11,16,10,15,
   11,16,12,16,13,15,13,16,14,14,14,13
PN 5106 DATA 14,12,14,11,14,10,14,9,14,8,
   14,7,14,6,14,7,14,8,14,9,14,10,14,11,1
   4,12,14,13
SW 5107 DATA 14,14,14,15,14,16,15,12,16,1
   2,17,13,17,14,16,14,15,14
QF 5108 DATA 16,15,16,16,17,16,18,16,19,1
   5,19,14,19,13,19,12,18,12,18,12,18,13,
   18,14,18,15,18,16,18,17,18,18,18,19
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KD 5109 REM CHARACTER SET DATA
PU 5110 DATA 0,0,0,0,0,0,0,0,0
SU 5111 DATA 64,0,0,0,0,0,0,0,0
QL 5112 DATA 60,0,0,4,142,122,49,0,0
HJ 5113 DATA 124,0,0,33,58,76,140,0,0
BP 5114 DATA 43,60,110,118,255,24,24,0,0
VD 5115 DATA 107,60,110,118,255,24,24,0,0
LP 5116 DATA 50,0,0,16,56,124,246,56,56
DW 5117 DATA 114,0,0,16,56,124,246,56,56
DL 5118 DATA 12,0,0,0,0,32,48,48,0
HZ 5119 DATA 76,0,0,0,0,32,48,48,0
DJ 5120 DATA 44,34,34,54,93,42,62,127,62
QJ 5121 DATA 108,28,20,20,93,42,62,127,62
YT 5122 DATA 97,36,24,24,60,90,255,255,12
6
XB 5123 DATA 33,0,0,24,60,90,255,255,126
JV 5124 DATA 98,0,60,110,126,122,62,28,0
IQ 5125 DATA 34,2,63,110,126,122,62,28,0
FJ 5126 DATA 99,96,240,233,254,254,233,24
0,96
UL 5127 DATA 35,96,240,232,252,252,232,24
0,96
XV 5128 DATA 100,0,28,62,122,126,110,63,2
CB 5129 DATA 36,0,28,62,122,126,110,60,0
LX 5130 DATA 101,126,255,255,90,60,24,24,
36
KT 5131 DATA 37,126,255,255,90,60,24,0,0
IO 5132 DATA 102,0,56,124,94,126,118,60,0
YF 5133 DATA 38,0,56,124,94,126,118,252,6
4
HS 5134 DATA 103,6,15,151,127,127,151,15,
6
YL 5135 DATA 39,6,15,23,63,63,23,15,6
PL 5136 DATA 40,64,252,118,126,94,124,56,
0
NI 5137 DATA 104,0,60,118,126,94,124,56,0
IJ 5138 DATA 41,24,60,90,231,231,90,60,24
ED 5139 DATA 105,24,60,90,231,231,90,60,2
4
HS 5140 DATA 42,24,60,90,231,231,90,60,24
FG 5141 DATA 106,0,24,36,90,90,36,24,0
LK 5142 DATA 3,102,102,255,102,102,255,10
2,102
TR 5143 DATA 67,102,102,255,102,102,255,1
02,102
GV 5199 DATA -1
```

education

CASTLE

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LISTING 1

Don't type the TYPO II Codes!

```
HS 10 REM CASTLE
DE 20 REM BY TRACY AND LORI HERSHEY
FF 30 REM (ATARI VERSION BY BILL MARQUARD
T)
GM 40 REM (c) 1986, ANTIC PUBLISHING
OL 50 BRK=1:IF PEEK(53279)=5 THEN BRK=0
UH 60 GOTO 90
SG 70 POKE 77,0:IF BRK THEN POKE 16,64:PO
KE 53774,64
ZY 80 RETURN
TV 90 DIM TP(8),COL(8),ANS$(114),INV$(114
),FRM$(114),INF$(114)
CY 100 ANS$(1,50)="  RECTANGLE      SQUARE
    PARALLELOGRAM   CIRCLE  "
UZ 110 ANS$(51,105)="    TRAPEZOID    SEMI
-CIRCLE   TRIANGLE      [ HELP ]    "
CQ 120 FRM$(1,50)="     W * L          S^2
        B * H       PI * R^2 "
VI 130 FRM$(51,105)="  1/2 *H*(B+T)   1/2
*PI*R^2 1/2 * B * H     [ HELP ]    "
CZ 140 INV$(1,50)="  RECTANGLE      SQUARE
    PARALLELOGRAM   CIRCLE  "
ZA 150 INV$(51,105)="    TRAPEZOID    SEMI
-CIRCLE   TRIANGLE      [ HELP ]    "
YC 160 INF$(1,50)="     W * L          S^2
        B * H       PI * R^2 "
UU 170 INF$(51,105)="  1/2 *H*(B+T)   1/2
*PI*R^2 1/2 * B * H     [ HELP ]    "
HP 180 COL(1)=0:COL(2)=13:COL(3)=26:COL(4
)=0
EX 190 COL(5)=13:COL(6)=26:COL(7)=0:COL(8
)=13
AF 200 TRUE=1:FALSE=0:NONE=FALSE:GRAPHICS
0
QL 210 GOSUB 720:REM DRAW INTRO SCREEN
QI 220 REM DRAW THE CASTLE
NY 230 GRAPHICS 7:POKE 708,56:POKE 709,18
6:POKE 710,130:POKE 712,150:GOSUB 70:C
OLOR 2:RESTORE 970
CJ 240 FOR I=1 TO 12:READ X1,Y1,X2,Y2:GOS
UB 530:NEXT I:REM DRAW RECTANGLES
IP 250 FOR I=1 TO 4:READ X1,Y1,X2,Y2,X3,X
4:GOSUB 600:NEXT I:REM TRAPEZOIDS
OJ 260 FOR I=1 TO 2:READ X1,Y1,X2,Y2,Y3,Y
4:GOSUB 550:NEXT I:REM PARALLELOGRAM
GK 270 FOR I=1 TO 4:READ X1,Y1,X2,Y2,X3,X
4
MW 280 PLOT X1,Y2:DRAWTO X2,Y1:DRAWTO X4,
Y1
ZD 290 DRAWTO X3,Y2:DRAWTO X1,Y2:NEXT I
OY 300 PLOT 41,10:DRAWTO 41,0:DRAWTO 49,3
:DRAWTO 41,6
IB 310 FOR I=1 TO 2:READ X1,Y1,X2,Y2:GOSU
B 620:NEXT I:REM TRIANGLES
VA 320 FOR P=1 TO 7:READ X1,Y1,X2,Y2,E,J:
GOSUB 570:NEXT P:REM CIRCLES
TQ 330 ON CHOICE GOSUB 640,680
VR 340 TEXT=PEEK(660)+PEEK(661)*256
JM 350 TP(1)=TEXT:TP(2)=TEXT+13:TP(3)=TEX
T+26:TP(4)=TEXT+40
JJ 360 TP(5)=TEXT+53:TP(6)=TEXT+66:TP(7)=
TEXT+80:TP(8)=TEXT+93
RW 370 SP=5:OLDSP=SP:GOSUB 1460:REM MAIN
PROGRAM
UN 380 FOR DR=1 TO NUMSHAPES-1:CORRECT=FA
LSE
KI 390 READ SHAPE:GOSUB 1700:COLOR 2
WN 400 ON SHAPE GOSUB 1750,1820,1840,1980
,2080,2190,2210,2280
MQ 410 NEXT DR
CJ 420 GOSUB 1700:REM ERASE SHAPE
NF 430 READ SHAPE,COLR,X1,Y1,X2,Y2:CORREC
T=FALSE:COLOR 2
PJ 440 GOSUB 620:GOSUB 1600:READ X1,Y1,X2
,Y2
UC 450 COLOR COLR
QT 460 PLOT X2,Y2:DRAWTO X1,Y1
DW 470 Y1=Y1+1:IF Y1<>(Y2+4) THEN 460
UY 480 ? CHR$(125);:IF NUMWRONG=0 THEN ?
" YOU ANSWERED EVERY ONE CORRECTLY!!!"
CI 490 IF NUMWRONG>0 THEN ? " YOU MISSED
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   ";NUMWRONG:?
SS 500 ? "Press TRIGGER to play again..."
   ;
RQ 510 IF STRIG(0) THEN 510
CO 520 GRAPHICS 0:GOSUB 70:GOTO 210
XR 530 PLOT X1,Y1:DRAWTO X2,Y1:DRAWTO X2,
   Y2:REM DRAW RECTANGLE
TZ 540 DRAWTO X1,Y2:DRAWTO X1,Y1:RETURN
ME 550 PLOT X1,Y2:DRAWTO X2,Y1:DRAWTO X2,
   Y3:REM DRAW PARALLELOGRAM
WM 560 DRAWTO X1,Y4:DRAWTO X1,Y2:RETURN
SK 570 PLOT X1,Y1:FOR I=0 TO E STEP J:REM
    CIRCLES & SEMI-CIRCLES
AZ 580 X=6*COS(I)+X2:Y=(-6)*SIN(I)+Y2
LK 590 DRAWTO X,Y:NEXT I:RETURN
KY 600 PLOT X1,Y2:DRAWTO X2,Y1:DRAWTO X3,
   Y1:REM DRAW TRAPEDOID
WK 610 DRAWTO X4,Y2:DRAWTO X1,Y2:RETURN
GC 620 PLOT X1,Y1:DRAWTO X2,Y2:DRAWTO X1,
   Y2:REM TRIANGLE
YV 630 DRAWTO X1,Y1:RETURN
IE 640 POKE 82,0:? "":POKE 752,1:REM DO S
   HAPES
PY 650 ? ANS$(1,39):? ANS$(40,78):? ANS$(
   79,104)
WA 660 IF  NOT HELP THEN ? " Use joystick
    to select SHAPE.";
ZQ 670 RETURN
DI 680 POKE 82,0:? "":POKE 752,1:REM DO F
   ORMULAS
WJ 690 ? FRM$(1,39):? FRM$(40,78):? FRM$(
   79,104)
SX 700 IF  NOT HELP THEN ? " Use joystick
    to select FORMULA.";
ZF 710 RETURN
RP 720 NUMSHAPES=32:? CHR$(125):POKE 710,
   146:POKE 752,1:REM INTRO. SCREEN
TA 730 POSITION 2,0:? "              THE CAS
   TLE GAME               ";
DI 740 POSITION 2,3:? "Formulas
   Shapes"
GX 750 POSITION 2,5:? "W * L            =
   RECTANGLE"
ED 760 POSITION 2,6:? "S^2              =
   SQUARE"
VP 770 POSITION 2,7:? "B * H            =
   PARALLELOGRAM"
MR 780 POSITION 2,8:? "PI * R^2         =
   CIRCLE"
DG 790 POSITION 2,9:? "1/2 * H * (B+T) =
   TRAPEZOID"
TI 800 POSITION 2,10:? "1/2 * PI * R^2  =
    SEMI-CIRCLE"
BU 810 POSITION 2,11:? "1/2 * H * B     =
    TRIANGLE"
YI 820 POSITION 2,13:? "Press joystick bu
   tton to play.":GOSUB 70:POKE 764,255
WF 830 IF STRIG(0) THEN 830
ZZ 840 S=55:GOSUB 1570:REM BEEP
EV 850 IF  NOT STRIG(0) THEN 850
BZ 860 GRAPHICS 2+16:CHOICE=1:REM START
MI 870 POSITION 2,4:PRINT #6;"WOULD YOU L
   IKE":GOSUB 70
WE 880 POSITION 6,5:PRINT #6;"TO TRY:";
RJ 890 IF  NOT STRIG(0) THEN S=25:GOSUB 1
   570:RETURN
LM 900 IF CHOICE=2 THEN 930
NF 910 POSITION 6,7:PRINT #6;"SHAPES";
NP 920 POSITION 5,9:PRINT #6;"FORMULAS";
HF 930 IF STICK(0)=14 THEN CHOICE=1:S=75:
   GOSUB 1570:GOTO 890
VJ 940 IF STICK(0)=13 THEN CHOICE=2:GOSUB
    1540:S=55:GOSUB 1570
SL 950 GOTO 890
QU 960 REM CASTLE DATA
QQ 970 DATA 5,37,77,76,39,60,46,76,7,15,1
   7,32,65,15,75,32
PB 980 DATA 10,6,14,10,70,10,80,15,60,10,
   70,15,68,6,72,10
SM 990 DATA 2,10,12,15,12,10,22,15,41,22,
   57,37,25,22,41,37
HM 1000 DATA 5,32,7,37,17,20,62,32,65,37,
   75,77
JN 1010 DATA 46,70,52,76,71,77,5,70,11,76
   ,33,39
OC 1020 DATA 10,20,15,17,30,27,67,17,72,2
   0,27,30
CN 1030 DATA 18,6,20,10,22,24,2,6,0,10,7,
   4
YL 1040 DATA 60,6,57,10,64,62,75,6,78,10,
```

```
   80,82
VZ 1050 DATA 41,10,57,22,41,10,25,22
FL 1060 DATA 28,47,22,47,6.6,0.2
WU 1070 DATA 39,30,33,30,6.6,0.2
AS 1080 DATA 55,30,49,30,6.6,0.2
KC 1090 DATA 68,47,62,47,6.6,0.2
EC 1100 DATA 16,65,22,65,3.15,0.2
IN 1110 DATA 56,65,62,65,3.15,0.2
IM 1120 DATA 37,48,42,48,3.15,0.2
IH 1130 REM
EB 1140 DATA 1,3,100,67,120,75,5,38,77,75

JP 1150 DATA 4,2,112,65,106,65,6.6,0.2,44
   ,96,6.6,0.1
UG 1160 DATA 5,2,100,65,105,75,120,125,48
   ,70,53,75,72,78
TC 1170 DATA 1,1,100,65,120,75,39,60,46,7
   5
WR 1180 DATA 6,1,100,65,106,65,3.15,0.1,1
   24,130,3.15,0.1
BQ 1190 DATA 5,2,100,60,110,75,120,130,5,
   70,10,75,32,38
WR 1200 DATA 4,2,112,65,106,65,6.6,0.2,12
   4,96,6.6,0.1
CY 1210 DATA 6,1,105,65,111,65,3.15,0.1,4
   4,130,3.15,0.1
CK 1220 DATA 1,1,100,62,110,75,7,15,17,32

NH 1230 DATA 3,3,100,65,105,75,55,65,10,2
   0,15,17,30,27
HW 1240 DATA 2,1,100,65,105,70,10,6,15,9
NH 1250 DATA 1,2,100,62,102,75,2,10,12,15

TC 1260 DATA 3,1,100,65,105,75,55,65,1,6,
   0,9,6,7
EP 1270 DATA 5,2,100,65,110,75,120,130,4,
   32,7,37,18,20
OE 1280 DATA 1,2,100,65,122,75,12,10,22,1
   5
HU 1290 DATA 3,1,100,65,110,75,60,70,18,6
   ,20,9,26,23
IM 1300 DATA 2,2,105,65,115,75,25,22,41,3
   7
PU 1310 DATA 7,1,100,65,120,75,40,10,25,2
   2
IC 1320 DATA 2,2,100,65,110,75,41,22,57,3
   7
BS 1330 DATA 4,3,112,65,106,65,6.6,0.2,66
   ,60,6.6,0.1
KK 1340 DATA 1,1,100,60,105,75,65,16,75,3
   2
NY 1350 DATA 1,2,100,62,102,72,60,10,70,1
   5
UU 1360 DATA 3,1,100,65,110,75,60,70,59,6
   ,56,9,63,68
JL 1370 DATA 5,2,110,75,100,65,130,120,62
   ,32,64,37,75,79
WJ 1380 DATA 1,2,100,67,122,72,70,10,80,1
   5
LV 1390 DATA 7,1,100,62,110,75,41,10,41,2
   2
BI 1400 DATA 3,3,100,65,110,75,60,70,68,1
   7,73,20,20,32
CJ 1410 DATA 2,1,100,70,105,75,68,6,72,9
GN 1420 DATA 3,1,100,65,105,75,55,65,76,6
   ,78,9,84,80
AI 1430 DATA 4,3,112,65,106,65,6.6,0.2,10
   0,60,6.6,0.1
JH 1440 DATA 6,1,100,65,106,65,3.15,0.1,8
   4,96,3.15,0.1
FW 1450 DATA 7,1,102,65,115,75,42,0,50,3
CP 1460 ROW=INT((SP-1)/3):OLDROW=INT((OLD
   SP-1)/3):REM INVERT TEXT
SZ 1470 POKE 656,OLDROW:POKE 657,COL(OLDS
   P):POKE 658,0
QX 1480 IF CHOICE=1 THEN ? ANS$((OLDSP-1)
   *13+1,(OLDSP-1)*13+13);
UF 1490 IF CHOICE=2 THEN ? FRM$((OLDSP-1)
   *13+1,(OLDSP-1)*13+13);
CN 1500 POKE 656,ROW:POKE 657,COL(SP):POK
   E 658,0
FO 1510 IF CHOICE=1 THEN ? INV$((SP-1)*13
   +1,(SP-1)*13+13);
PR 1520 IF CHOICE=2 THEN ? INF$((SP-1)*13
   +1,(SP-1)*13+13);
AS 1530 RETURN
AH 1540 POSITION 6,7:PRINT #6;"SHAPES":RE
   M INVERT CHOICES
AW 1550 POSITION 5,9:PRINT #6;"FORMULAS"
```

continued on next page

```
BB 1560 RETURN
EK 1570 SOUND 0,5,10,10:REM BEEP
ON 1580 FOR D=1 TO 20:NEXT D
YL 1590 SOUND 0,0,0,0:RETURN
MP 1600 GOSUB 70:TR=STRIG(0):ST=STICK(0):
   OLDSP=SP:IF ST=15 AND TR=1 THEN 1600:R
   EM CHECK STICK
UQ 1610 POKE 53279,7:IF TR=0 THEN S=35:GO
   SUB 1570:ANS=SP:GOSUB 2320
EM 1620 IF ANS=8 THEN GOSUB 2280
PP 1630 IF CORRECT THEN RETURN
JS 1640 IF ST=7 THEN SP=SP+1:IF (SP-1)/3=
   INT((SP-1)/3) THEN SP=SP-3
VG 1650 IF SP=9 THEN SP=7
KZ 1660 IF ST=11 THEN SP=SP-1:IF SP/3=INT
   (SP/3) THEN SP=SP+3:IF SP=9 THEN SP=8
DL 1670 IF ST=13 THEN SP=SP+3:IF SP>8 THE
   N SP=SP-9:IF SP=0 THEN SP=3
VP 1680 IF ST=14 THEN SP=SP-3:IF SP<1 THE
   N SP=9+SP:IF SP=9 THEN SP=6
ZP 1690 GOSUB 1460:GOTO 1600
II 1700 COLOR 0:X1=85:X2=150:REM ERASE SH
   APE
SU 1710 FOR Y=55 TO 80:SOUND 0,255-(2*Y),
   10,10
YD 1720 PLOT X1,Y:DRAWTO X2,Y
OW 1730 NEXT Y:SOUND 0,0,0,0
AZ 1740 RETURN
BX 1750 READ COLR,X1,Y1,X2,Y2:REM RECTANG
   LE
JY 1760 GOSUB 530:GOSUB 1600
WA 1770 READ X1,Y1,X2,Y2:COLOR COLR
QW 1780 FOR Y=Y1 TO Y2
YY 1790 PLOT X1,Y:DRAWTO X2,Y
LZ 1800 NEXT Y
AS 1810 RETURN
PZ 1820 GOSUB 1750:REM SQUARE
AY 1830 RETURN
OJ 1840 READ COLR,X1,Y1,X2,Y2,Y3,Y4:REM P
   ARALLELOGRAM
SC 1850 PA=PA+1
LA 1860 GOSUB 550:GOSUB 1600
WU 1870 IF PA=1 OR PA=5 THEN 1930
BZ 1880 READ X1,Y1,X2,Y2,X3,X4:COLOR COLR

IK 1890 PLOT X2,Y1:DRAWTO X1,Y2
DU 1900 X1=X1+1:X2=X2+1
YM 1910 IF X2<>X3 THEN 1890
AX 1920 RETURN
DJ 1930 READ X1,Y1,X2,Y2,Y3,Y4:COLOR COLR

HX 1940 PLOT X1,Y2:DRAWTO X2,Y1
FN 1950 Y2=Y2+1:Y1=Y1+1
WW 1960 IF Y2<>Y4 THEN 1940
BM 1970 RETURN
IK 1980 READ COLR,X1,Y1,X2,Y2,E,J:REM CIR
   CLE
ML 1990 GOSUB 570:GOSUB 1600
GD 2000 READ XC,YC,E,J:COLOR COLR
RQ 2010 XC=XC/2:YC=YC/2
PG 2020 FOR R=0 TO E STEP J
SQ 2030 X=6*COS(R)+XC
NY 2040 Y=(-6)*SIN(R)+YC
XN 2050 PLOT XC,YC:DRAWTO X,Y
JD 2060 NEXT R
AV 2070 RETURN
OQ 2080 READ COLR,X1,Y1,X2,Y2,X3,X4:REM T
   RAPEZOID
YB 2090 GOSUB 600
ZM 2100 GOSUB 1600
YZ 2110 READ X1,Y1,X2,Y2,X3,X4
EF 2120 COLOR COLR
HF 2130 PLOT X1,Y2:DRAWTO X2,Y1
DR 2140 X1=X1+1:X2=X2+1
NY 2150 IF X2<>X3 THEN 2130
IA 2160 PLOT X3,Y1:DRAWTO X1,Y2
TT 2170 X1=X1+1:IF X1<>X4 THEN 2160
BA 2180 RETURN
QH 2190 GOSUB 1980:REM SEMI-CIRCLE
AE 2200 RETURN
FA 2210 READ COLR,X1,Y1,X2,Y2:REM TRIANGL
   E
YK 2220 GOSUB 620
ZX 2230 GOSUB 1600
BF 2240 READ X1,Y1,X2,Y2:X3=X2:COLOR COLR

NT 2250 PLOT X1,Y1:DRAWTO X2,Y2:X2=X2+1
RF 2260 IF X2<>X3+17 THEN 2250
AZ 2270 RETURN
EV 2280 HELP=TRUE:? CHR$(125):ON CHOICE G
   OSUB 690,650
FB 2290 FOR D=1 TO 500:NEXT D:HELP=FALSE:
   ANS=0
GD 2300 ? CHR$(125):ON CHOICE GOSUB 650,6
   90
CU 2310 ANS=0:RETURN
GS 2320 IF ANS=SHAPE THEN CORRECT=TRUE
EW 2330 IF ANS=8 THEN RETURN
DX 2340 IF ANS<>SHAPE THEN NUMWRONG=NUMWR
   ONG+1:GOSUB 2360
AV 2350 RETURN
YO 2360 S=150:FOR BUZZ=1 TO 3:GOSUB 1570
QU 2370 NEXT BUZZ:RETURN
```

ST RESOURCE

CASTLE ST VERSION

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LISTING 1

```
1000   ' Area Formula Castle Builder
1010   '    by Tracy and Lori Hershey
1020   '     (c) 1986 Antic Publishing, Inc.
1030   '    ST version by Bill Marquardt
1040   '    version 070286
1050   '
1060   '----------------------------------------------------------
1070    BASICON=0: BASICOFF=1: FALSE=0: TRUE=1: NONE=0: BELL$=chr$(7)
1080    dim YMIN( 9 ),YMAX( 9 ): gosub INIT
1090    poke GEMFLAG,BASICOFF
1100    TITLE$=" CASTLE GAME "
```

```
1110    gosub NEWTITLE
1120    poke GEMFLAG,BASICON
1130    MORE=TRUE
1140   '
1150   while MORE=TRUE
1160        restore CASTLE.DATA
1170        gosub INTRO
1180        gosub START
1190   '
1200        DRAW.CASTLE:
1210        color 1,8,1: clearw 2
1220        for I =1 to 12
1230              read X1,Y1,X2,Y2
1240              linef X1,Y1,X2,Y1: linef X2,Y1,X2,Y2
1250              linef X2,Y2,X1,Y2: linef X1,Y2,X1,Y1
1260        next I
1270        for I=1 to 4
1280              read X1,Y1,X2,Y2,X3,X4
1290              linef X1,Y2,X2,Y1: linef X2,Y1,X3,Y1
1300              linef X3,Y1,X4,Y2: linef X4,Y2,X1,Y2
1310        next I
1320        for I=1 to 2
1330              read X1,Y1,X2,Y2,Y3,Y4
1340              linef X1,Y2,X2,Y1: linef X2,Y1,X2,Y3
1350              linef X2,Y3,X1,Y4: linef X1,Y4,X1,Y2
1360        next I
1370        for I=1 to 4
1380              read X1,Y1,X2,Y2,X3,X4
1390              linef X1,Y2,X2,Y1: linef X2,Y1,X4,Y1
1400              linef X4,Y1,X3,Y2: linef X3,Y2,X1,Y2
1410        next I
1420        linef 83,20,83,0: linef 83,0,100,5
1430        linef 100,5,83,10
1440        for I=1 to 2
1450              read X1,Y1,X2,Y2: linef X1,Y1,X2,Y2
1460              linef X2,Y2,X1,Y2: linef X1,Y2,X1,Y1
1470        next I
1480        for I=1 to 4
1490              read X,Y,R
1500              circle X,Y,R
1510        next I
1520        for I=1 to 3
1530              read X,Y,R,A1,A2,X1,X2
1540              circle X,Y,R,A1,A2: linef X1,Y,X2,Y
1550        next I
1560   '
1570        ON ITEM gosub DO.SHAPES, DO.FORMULAS
1580   '
1590   DRAW.MENU.BOXES:
1600        color 1,0,1+ITEM
1610        X1=170: X2=300
1620        for I=1 to 8
1630              read Y1,Y2
1640              linef X1,Y1,X2,Y1: linef X2,Y1,X2,Y2
1650        next I
1660        color 1,8,1: fill 0,0: fill 100,0
1670   '
1680   '- - - - - - - - - - - - - - - - - - - - - - - - - - -
1690   MAIN:
1700        NUM.WRONG=NONE
1710        XMIN=170: XMAX=300: NUM.CHOICES=7
1720        for I=1 to NUM.CHOICES
1730              YMIN(I)=32+(I*9): YMAX(I)=YMIN(I)+9
```

continued on next page

```
1740       next I
1750       for DRAW=1 to NUM.SHAPES
1760       RESPONSE=FALSE
1770       read SHAPE: gosub ERASE.SHAPE
1780       on SHAPE gosub DREC,DSQR,DPAR,DCIR,DTRA,DSEM,DTRI
1790       while RESPONSE=FALSE
1800            ITEM=NONE
1810            gosub GETBUTTON: if ITEM=SHAPE then RESPONSE=TRUE
1820            if(RESPONSE=FALSE)and(ITEM<>NONE)then gosub WRONG.ANS
1830       wend
1840       if RESPONSE=TRUE then ? BELL$;: color 1,COLR,1: fill XF,YF
1850       next DRAW
1860       gosub FINISH
1870  wend
1880 end
1890 '
1900 '----------------------------------------------------------
1910 FINISH:
1920  gosub ERASE.SHAPE
1930  gotoxy 19,10: ? "                    "
1940  gotoxy 19,10: ? "You missed ";NUM.WRONG;"."
1950  gotoxy 19,11: ? "                    "
1960  if NUM.WRONG=NONE then gotoxy 19,11:? "    VERY good!    "
1970  gotoxy 19,12: ? "   Try again?   "
1980  gotoxy 24,14: ? "NO ":gotoxy 24,16: ? "YES"
1990  color 1,2,2: linef 210,126,245,126: linef 245,126,245,136
2000  linef 245,136,210,136: linef 210,136,210,126
2010  color 1,3,3: linef 210,144,245,144: linef 245,144,245,154
2020  linef 245,154,210,154: linef 210,154,210,144
2030  YMIN(1)=148: YMAX(1)=158: YMIN(2)=166: YMAX(2)=176
2040  XMIN=210: XMAX=245: NUM.CHOICES=2: ITEM=NONE
2050  while ITEM=NONE: gosub GETBUTTON: wend
2060  if ITEM=1 then MORE=FALSE
2070 return
2080 '
2090 '----------------------------------------------------------
2100 WRONG.ANS:
2110  gotoxy 23,0: ? "SORRY!";
2120  SOUND 1,15,12,3,20: SOUND 1,0,0,0,0
2130  for DELAY=1 to 1000: next DELAY
2140  gotoxy 23,0: ? "      "
2150  color 1,8,1: fill 230,5: NUM.WRONG=NUM.WRONG+1
2160 return
2170 '
2180 '----------------------------------------------------------
2190 DREC:
2200  read COLR,X1,Y1,X2,Y2,XF,YF
2210  linef X1,Y1,X2,Y1: linef X2,Y1,X2,Y2
2220  linef X2,Y2,X1,Y2: linef X1,Y2,X1,Y1
2230 return
2240 '
2250 DSQR:
2260  gosub DREC
2270 return
2280 '
2290 DPAR:
2300  read COLR,X1,Y1,X2,Y2,Y3,Y4,XF,YF
2310  linef X1,Y2,X2,Y1: linef X2,Y1,X2,Y3
2320  linef X2,Y3,X1,Y4: linef X1,Y4,X1,Y2
2330 return
2340 '
2350 DCIR:
2360  read COLR,XC,YC,RAD,XF,YF
2370  circle XC,YC,RAD
```

```
2380  return
2390  '
2400  DTRA:
2410   read COLR,X1,Y1,X2,Y2,X3,X4,XF,YF
2420   linef X1,Y2,X2,Y1: linef X2,Y1,X3,Y1
2430   linef X3,Y1,X4,Y2: linef X4,Y2,X1,Y2
2440  return
2450  '
2460  DSEM:
2470   read COLR,XC,YC,RAD,XF,YF
2480   circle XC,YC,RAD,0,1800: linef XC-RAD,YC,XC+RAD,YC
2490  return
2500  '
2510  DTRI:
2520   read COLR,X1,Y1,X2,Y2,XF,YF
2530   linef X1,Y1,X2,Y2: linef X2,Y2,X1,Y2
2540   linef X1,Y2,X1,Y1
2550  return
2560  '
2570  '-----------------------------------------------------------
2580  DO.SHAPES:
2590   gotoxy 19,2: ? "   RECTANGLE   "
2600   gotoxy 19,3: ? "    SQUARE     "
2610   gotoxy 19,4: ? " PARALLELOGRAM "
2620   gotoxy 19,5: ? "    CIRCLE     "
2630   gotoxy 19,6: ? "   TRAPEZOID   "
2640   gotoxy 19,7: ? "  SEMI-CIRCLE  "
2650   gotoxy 19,8: ? "   TRIANGLE    "
2660   gotoxy 19,10: ? "What's the name"
2670   gotoxy 19,11: ? "of this shape? "
2680  return
2690  '
2700  '-----------------------------------------------------------
2710  DO.FORMULAS:
2720   gotoxy 20,2: ? "     W * L     "
2730   gotoxy 20,3: ? "      S^2      "
2740   gotoxy 20,4: ? "     B * H     "
2750   gotoxy 20,5: ? "    PI * R^2   "
2760   gotoxy 20,6: ? "1/2 * H *(B+T)"
2770   gotoxy 20,7: ? "1/2 * PI * R^2"
2780   gotoxy 20,8: ? " 1/2 * H * B  "
2790   gotoxy 19,10: ? "Formula for area"
2800   gotoxy 19,11: ? " of this shape?"
2810  return
2820  '
2830  '-----------------------------------------------------------
2840  ERASE.SHAPE:
2850   color 1,0,0: X1=171: X2=299
2860   for Y=110 to 159: linef X1,Y,X2,Y: next Y
2870   color 1,0,1
2880  return
2890  '
2900  '-----------------------------------------------------------
2910  INTRO:
2920   fullw 2: clearw 2: NUM.SHAPES=32
2930   gotoxy 2,3: ? "FORMULAS"
2940   gotoxy 20,3: ? "SHAPES"
2950   gotoxy 2,5: ? "W * L              = RECTANGLE"
2960   gotoxy 2,6: ? "S^2                = SQUARE"
2970   gotoxy 2,7: ? "B * H              = PARALLELOGRAM"
2980   gotoxy 2,8: ? "PI * R^2           = CIRCLE"
2990   gotoxy 2,9: ? "1/2 * H * (B+T)    = TRAPEZOID"
3000   gotoxy 2,10: ? "1/2 * PI * R^2     = SEMI-CIRCLE"
```

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```
3010   gotoxy 2,11: ? "1/2 * H * B       = TRIANGLE"
3020   gotoxy 4,14: ? "Press mouse button to play.": gosub GETBUTTON
3030  return
3040  '
3050  '------------------------------------------------------------
3060  START:
3070   clearw 2
3080   gotoxy 4,4: ? "Would you like to try: "
3090   gotoxy 8,6: ? "     Shapes     "
3100   gotoxy 8,8: ? "    Formulas    "
3110   color 2,0,2
3120   linef 80,54,172,54: linef 172,54,172,65
3130   linef 172,65,80,65: linef 80,65,80,54
3140   color 3,0,3
3150   linef 80,72,172,72: linef 172,72,172,83
3160   linef 172,83,80,83: linef 80,83,80,72
3170   color 1,0,1: ITEM=NONE: NUM.CHOICES=2: XMIN=80:XMAX=172
3180   YMIN(1)=76: YMAX(1)=87: YMIN(2)=94: YMAX(2)=105
3190   while ITEM=NONE: gosub GETBUTTON
3200   wend:return
3210  '
3220  '------------------------------------------------------------
3230  CASTLE.DATA:
3240   data 10,75,155,150,78,120,93,150,15,30,35,65,130,30,150,65
3250   data 21,12,29,20,140,20,160,30,120,20,140,30,136,12,144,20
3260   data 5,20,25,30,25,20,45,30,83,45,115,75,50,45,83,75
3270   data 10,65,15,75,35,40,125,65,130,75,150,155
3280   data 93,140,103,150,145,155,10,140,20,150,68,78
3290   data 20,40,30,35,60,55,135,35,145,40,55,60
3300   data 36,12,41,20,45,49,5,12,0,20,14,8
3310   data 120,12,115,20,129,124,151,12,156,20,160,165
3320   data 83,20,115,45,83,20,50,45
3330   data 44,95,13,66,60,13
3340   data 99,60,13,124,95,13
3350   data 44,130,13,0,1800,31,57,124,130,13,0,1800,111,137
3360   data 85,97,13,0,1800,72,98
3370  '
3380  '------------------------------------------------------------
3390  BOX.DATA:
3400   data 18,27,27,36,36,45,45,54,54,63,63,72,72,81,90,160
3410  '
3420  '------------------------------------------------------------
3430  PROGRAM.DATA:
3440   data 1,6,200,135,240,150,11,76
3450   data 4,5,212,130,13,44,95
3460   data 5,7,200,130,210,150,240,250,104,141
3470   data 1,5,200,130,240,150,79,121
3480   data 6,7,212,130,13,123,129
3490   data 5,7,200,120,220,150,240,260,21,141
3500   data 4,5,212,130,17,124,95
3510   data 6,7,223,130,17,43,129
3520   data 1,2,200,125,220,150,16,31
3530   data 3,3,200,130,210,150,110,130,21,41
3540   data 2,3,200,130,205,135,22,13
3550   data 1,1,200,125,205,150,6,21
3560   data 3,3,200,130,210,150,110,130,6,13
3570   data 5,5,200,130,220,150,240,260,15,74
3580   data 1,1,200,130,245,150,26,21
3590   data 3,3,200,130,220,150,120,140,42,13
3600   data 2,5,210,130,234,150,51,46
3610   data 7,1,200,130,240,150,75,43
3620   data 2,5,200,130,225,150,84,46
3630   data 4,6,212,130,20,66,59
3640   data 1,2,200,120,210,150,131,31
```

```
3650    data 1,1,200,125,205,145,121,21
3660    data 3,3,200,130,220,150,120,140,120,13
3670    data 5,5,220,150,200,130,260,240,129,74
3680    data 1,1,200,135,245,145,141,21
3690    data 7,1,200,125,220,150,84,40
3700    data 3,3,200,130,220,150,120,140,140,50
3710    data 2,3,200,140,212,150,137,13
3720    data 3,3,200,130,210,150,110,130,155,16
3730    data 4,6,230,140,18,99,60
3740    data 6,7,230,140,18,84,96
3750    data 7,2,205,130,230,150,84,6
3760    '
3770    '-----------------------------------------------------
3780   GETBUTTON:
3790    while BUTTON=NONE: gosub GETMOUSE: wend: BUTTON=NONE
3800    if (MX>XMIN) and (MX<XMAX) then gosub YCHECK
3810   return
3820    '
3830    '-----------------------------------------------------
3840   YCHECK:
3850    ITEM=NONE
3860    for I=1 to NUM.CHOICES
3870       if (MY>YMIN(I)) and (MY<YMAX(I)) then ITEM=I
3880    next I
3890   return
3900    '
3910    '-----------------------------------------------------
3920   INIT:
3930    A#=GB
3940    GINTIN=peek(A#+8)
3950    OUTHANDLE=peek(SYSTAB+8)
3960    GEMFLAG=SYSTAB+24
3970   return
3980    '
3990    '-----------------------------------------------------
4000   NEWTITLE:
4010    poke GINTIN+0,OUTHANDLE
4020    poke GINTIN+2,2
4030    S# = GINTIN+4
4040    TITLE$ = TITLE$ + chr$( 0 )
4050    poke S#,varptr(TITLE$)
4060    GEMSYS( 105 )
4070   return
4080    '
4090    '-----------------------------------------------------
4100   GETMOUSE:
4110    poke CONTRL+0,124
4120    poke CONTRL+2,0
4130    poke CONTRL+6,0
4140    vdisys( 1 )
4150    BUTTON=peek( INTOUT )
4160    MX=peek( PTSOUT+0 )
4170    MY=peek( PTSOUT+2 )
4180   return
```

Checksum for file: stcastle.bas

1000 :0A64	1080 :094D	1160 :06D0	1240 :0A75	1320 :03D9	1400 :0A79
1010 :0968	1090 :06D5	1170 :0475	1250 :0A76	1330 :0680	1410 :02CE
1020 :09EE	1100 :05BF	1180 :0478	1260 :02D1	1340 :0A78	1420 :08EE
1030 :0AA7	1110 :054F	1190 :00F2	1270 :03DF	1350 :0A7D	1430 :04EC
1040 :0529	1120 :0691	1200 :0415	1280 :0682	1360 :02D2	1440 :03DC
1050 :00ED	1130 :0375	1210 :06BF	1290 :0A7B	1370 :03E0	1450 :0A06
1060 :0AF3	1140 :00ED	1220 :0409	1300 :0A79	1380 :0683	1460 :0A79
1070 :0F8D	1150 :0590	1230 :050E	1310 :02CD	1390 :0A7D	1470 :02D4

continued on next page

1480 :03E2	1930 :052B	2380 :036D	2830 :0AF9	3280 :0A76	3730 :0644
1490 :03C5	1940 :0C81	2390 :00F5	2840 :0417	3290 :097C	3740 :064B
1500 :0493	1950 :052E	2400 :022B	2850 :0715	3300 :0874	3750 :06FE
1510 :02CF	1960 :0ED5	2410 :096F	2860 :0BA4	3310 :0A92	3760 :00F7
1520 :03DC	1970 :08AF	2420 :0A77	2870 :03DA	3320 :06FE	3770 :0AFD
1530 :0668	1980 :0B58	2430 :0A7E	2880 :0372	3330 :05AF	3780 :03C8
1540 :0A65	1990 :0E40	2440 :036A	2890 :00FA	3340 :05E5	3790 :1063
1550 :02D3	2000 :0ADB	2450 :00F2	2900 :0AF7	3350 :0B80	3800 :0D33
1560 :00F3	2010 :0E32	2460 :022F	2910 :0292	3360 :0682	3810 :036C
1570 :0A94	2020 :0ADD	2470 :07C0	2920 :09D1	3370 :00F4	3820 :00F4
1580 :00F5	2030 :0BDF	2480 :0E37	2930 :072F	3380 :0AFA	3830 :0AFA
1590 :0549	2040 :0BBD	2490 :036F	2940 :06BB	3390 :033A	3840 :02C0
1600 :052A	2050 :0C7A	2500 :00EE	2950 :0869	3400 :0BB3	3850 :036C
1610 :03BA	2060 :07BE	2510 :0235	2960 :07BD	3410 :00EF	3860 :06CE
1620 :03E2	2070 :0369	2520 :0802	2970 :0982	3420 :0AF5	3870 :0C50
1630 :03A7	2080 :00F1	2530 :0A79	2980 :0864	3430 :0464	3880 :02DB
1640 :0A79	2090 :0AF7	2540 :0584	2990 :0A01	3440 :0726	3890 :0374
1650 :02D4	2100 :039A	2550 :036C	3000 :0A94	3450 :063A	3900 :00F3
1660 :0919	2110 :06E7	2560 :00F4	3010 :08EE	3460 :0906	3910 :0AF9
1670 :00F5	2120 :07F1	2570 :0AFA	3020 :13A0	3470 :0758	3920 :023C
1680 :0588	2130 :08F6	2580 :038E	3030 :0366	3480 :069D	3930 :01F9
1690 :022F	2140 :04EF	2590 :0794	3040 :00EE	3490 :08D8	3940 :0593
1700 :04E0	2150 :0CD9	2600 :06C9	3050 :0AF4	3500 :0669	3950 :07E1
1710 :08EC	2160 :0369	2610 :08BD	3060 :0291	3510 :066E	3960 :0569
1720 :06C7	2170 :00F1	2620 :06AE	3070 :037A	3520 :071A	3970 :0373
1730 :08F7	2180 :0AF7	2630 :07B0	3080 :0C4F	3530 :0894	3980 :00FB
1740 :02D4	2190 :0224	2640 :080D	3090 :0731	3540 :071D	3990 :0B01
1750 :0775	2200 :07FD	2650 :0758	3100 :0810	3550 :06ED	4000 :036A
1760 :04E5	2210 :0A73	2660 :0A3C	3110 :03D0	3560 :0869	4010 :0768
1770 :0945	2220 :0A74	2670 :0A0B	3120 :0A00	3570 :08AE	4020 :04F9
1780 :0E6E	2230 :0367	2680 :0370	3130 :09A1	3580 :0722	4030 :03A2
1790 :0701	2240 :00EF	2690 :00F8	3140 :03D5	3590 :089F	4040 :065E
1800 :0365	2250 :023D	2700 :0AF5	3150 :0A03	3600 :0724	4050 :07B0
1810 :0F27	2260 :0408	2710 :042E	3160 :09A4	3610 :0725	4060 :0389
1820 :10CB	2270 :036B	2720 :05BF	3170 :0ED9	3620 :072B	4070 :036B
1830 :027A	2280 :00F3	2730 :05D7	3180 :0B4F	3630 :063D	4080 :00F3
1840 :1081	2290 :022E	2740 :05AA	3190 :0A98	3640 :0745	4090 :0AF9
1850 :03BB	2300 :096F	2750 :069D	3200 :054D	3650 :0750	4100 :0368
1860 :04B0	2310 :0A76	2760 :073A	3210 :00ED	3660 :08CA	4110 :0565
1870 :027E	2320 :0A7B	2770 :075D	3220 :0AF3	3670 :08E5	4120 :0501
1880 :0208	2330 :0368	2780 :066E	3230 :0406	3680 :075A	4130 :0506
1890 :00F9	2340 :00F0	2790 :0AE6	3240 :0C8D	3690 :072C	4140 :03ED
1900 :0AF6	2350 :0226	2800 :0A06	3250 :0C61	3700 :08C8	4150 :06BC
1910 :02C6	2360 :07BE	2810 :036B	3260 :0B6B	3710 :074F	4160 :05ED
1920 :05FB	2370 :05A4	2820 :00F3	3270 :09E8	3720 :08CF	4170 :05F1
					4180 :036D

ST RESOURCE

TYPO ST

Article on page 83

LISTING 1

```
1000  ' TYPO/ST
1010  ' (c) 1986 Antic Publishing
1020  ' Written by Patrick Bass and Bill Marquardt
1030  ' Version 050286
1040  '-------------------------------------------------------------
1050  '
1060   DISK=1: OUTPUT=2: TRUE=(-1): FALSE=0: CHECKSUMMING=TRUE
1070   TV=FALSE: PRINTER=FALSE
1080  '
```

```
1090   print "File to Check:": input FILENAME$
1100   print "Output on:"
1110   print "(S)creen or ": print "(P)rinter ": input DEVICE$
1120   if( DEVICE$="p" )or( DEVICE$="P" )then PRINTER=TRUE else TV=TRUE
1130  '
1140   if TV then print "Checksum for file: ": print FILENAME$: print
1150   if PRINTER then lprint "Checksum for file: ";FILENAME$: lprint
1160  '
1170  '------------------------------------------------------------------
1180   open "I", #DISK, FILENAME$
1190  '
1200   while CHECKSUMMING
1210       LINENUMBER=0: CHECKSUM=0
1220  '
1230       gosub GETALINE
1240  '
1250       DECIMAL=CHECKSUM: gosub DECTOHEX
1260       OUTPUT$=str$( LINENUMBER )+" :"+HI$+LO$
1270       if PRINTER then lprint OUTPUT$ else print OUTPUT$
1280   wend
1290  '
1300   close DISK
1310  end
1320  '
1330  '------------------------------------------------------------------
1340  GETALINE:
1350   BLINE$="": on error goto 1300
1360   GOTALINE=FALSE
1370  '
1380   while not GOTALINE
1390       line input#DISK, BLINE$
1400       if len( BLINE$ )>1 then GOTALINE=TRUE
1410   wend
1420  '
1430   LINENUMBER=val( BLINE$ )
1440   for CHAR=1 to len( BLINE$ )
1450       OK=TRUE
1460       CHARACTER$=mid$( BLINE$, CHAR, 1 )
1470       if CHARACTER$=" " then OK=FALSE
1480       if OK then CHECKSUM=CHECKSUM+asc( CHARACTER$+chr$( 0 ))
1490   next CHAR
1500  return
1510  '
1520  '------------------------------------------------------------------
1530  DECTOHEX:
1540   DECIMAL=abs( DECIMAL )
1550   HI=int( DECIMAL/256 ): LO=( DECIMAL-( HI*256 ))
1560   HH=int( HI/16 ): HL=( HI-( HH*16 ))
1570   LH=int( LO/16 ): LL=( LO-( LH*16 ))
1580   HI$=chr$( 48+HH-( 7*( HH>9 )))+chr$( 48+HL-( 7*( HL>9 )))
1590   LO$=chr$( 48+LH-( 7*( LH>9 )))+chr$( 48+LL-( 7*( LL>9 )))
1600  return
```

Checksum for file: typost.bas

1000 :0314	1100 :06DB	1200 :065A	1300 :0405	1400 :0AA0	1500 :0366
1010 :0879	1110 :10E4	1210 :071C	1310 :01FC	1410 :0274	1510 :00EE
1020 :0F70	1120 :11A0	1220 :00EC	1320 :00ED	1420 :00EE	1520 :0C5C
1030 :0506	1130 :00EC	1230 :052F	1330 :0C5B	1430 :0718	1530 :0357
1040 :0C59	1140 :13E6	1240 :00EE	1340 :034B	1440 :079D	1540 :066C
1050 :00ED	1150 :140D	1250 :09F5	1350 :0896	1450 :02E1	1550 :0B18
1060 :0EA7	1160 :00EF	1260 :0A4D	1360 :04C5	1460 :089D	1560 :07E8
1070 :0720	1170 :0C5D	1270 :1005	1370 :00F2	1470 :08BE	1570 :0809
1080 :00F0	1180 :0714	1280 :0279	1380 :0689	1480 :0F39	1580 :0C13
1090 :0C85	1190 :00F2	1290 :00F3	1390 :07AD	1490 :03AB	1590 :0C2E
					1600 :0367

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MOUSE EDITOR

Article on page 57

LISTING 1

```
1000 'Atari ST Mouse Editor
1010 '(c) 1986 Antic Publishing  Ver. 070286
1020 'Written by Kevin Kennedy
1030 '
1040  TRUE=1: FALSE=0: DESIGNING=TRUE: OUTPUT=2
1050  LEFT=1: RIGHT=2: BOTH=3
1060  fullw OUTPUT: clearw OUTPUT: color 1,2,10,1,1: MP=1
1070  dim MOUSE( 16,16 ), MOUSE2( 16 ), SHADOW( 16 )
1080  for A=1 to 16
1090      for B=1 to 16
1100             MOUSE( A, B )=0
1110      next B
1120  next A
1130  close #1
1140  gosub GRID
1150  gosub OPTIONPR
1160 '
1170 '- - - - - - - - - - - - - - - - - - - - - - - - - -
1180  while DESIGNING
1190      gosub BTOWAIT
1200      if MX>157 then gosub SELECT else gosub DRAW
1210      gosub BTFWAIT
1220  wend
1230 end
1240 '
1250 '-------------------------------------------------------------
1260 GRID:
1270  for A=0 to 128 step 8
1280      linef A, 0, A, 128
1290  next A
1300  for A=0 to 128 step 8
1310      linef 0, A, 128, A
1320  next A
1330 return
1340 '
1350 '-------------------------------------------------------------
1360 MOUSESTAT:
1370  A#=GB
1380  IOUT=peek( A#+12 )
1390  gemsys( 79 )
1400  MX=peek( IOUT+2 )
1410  MY=peek( IOUT+4 )
1420  BUTTON=peek( IOUT+6 )
1430  KB=peek( IOUT+8 )
1440 return
1450 '
1460 '-------------------------------------------------------------
1470 OPTIONPR:
1480  color 1, 3, 10: X=186: Y=35: X2=287: Y2=142: gosub ROUND
1490  color 1, 0, 10: X=187: Y=36: X2=286: Y2=141: gosub ROUND
1500  gotoxy 21,2: print  "RESET MOUSE"
1510  gotoxy 21,4: print  "CHANGE MOUSE"
1520  gotoxy 21,6: print  "SAVE SHAPE"
1530  gotoxy 21,8: print  "LOAD SHAPE"
1540  gotoxy 21,10: print  "SAVE STATE"
1550  gotoxy 21,12: print  "LOAD STATE"
```

```
1560  color 1, 3, 3
1570  for A=32 to 121 step 18
1580     linef 186, A, 286, A
1590  next A
1600  color 1, 3, 10
1610 return
1620 '
1630 '-----------------------------------------------------------
1640 SELECT:
1650  SELECTION=0
1660  restore LINEDATUM
1670  for A=1 to 6
1680     read Y
1690     if(MX>186)*(MX<286)*(MY>35)*(MY<142)then 1700 else return
1700     if( MY>=Y )*( MY<Y+17 )then goto 1720
1710  next A
1720  SEL=A
1730  if( A<1 )+( A>6 )then return else color 1, 2, 10: fill 189, A*18+7
1740  on SEL gosub GRAFMOUSE, REDES, SAVEA, LOADA, SVE, LOD
1750  color 1, 0, 10: fill 189, SEL*18+7: color 1, 2, 10
1760 return
1770 '
1780 LINEDATUM:
1790  data 35, 53, 71, 89, 107, 125
1800 '
1810 '-----------------------------------------------------------
1820 BTOWAIT:
1830  gosub MOUSESTAT
1840  if BUTTON then return else 1820
1850 '
1860 '-----------------------------------------------------------
1870 BTFWAIT:
1880  gosub MOUSESTAT
1890  if BUTTON then 1870 else return
1900 '
1910 '-----------------------------------------------------------
1920 VIEW:
1930  A=X2+146: B=Y2+20
1940  COL=MOUSE( X2, Y2 ): CO=COL: if COL=2 then CO=0
1950  color 1, 2, CO: linef A, B, A, B: B=B+40
1960  if COL=1 then CO=2
1970  if COL=2 then CO=1
1980  color 1, 2, CO: linef A, B, A, B
1990 return
2000 '
2010 '-----------------------------------------------------------
2020 REDES:
2030  gosub CLEARLIN
2040  gosub HOTSPOT
2050  if RET=1 then return
2060  for Y=1 to 16
2070     for X=1 to 16
2080          A=MOUSE( X, Y )
2090          if A=1 then ADD=ADD+2^( 16-X )
2100          if A=2 then ADD2=ADD2+2^( 16-X )
2110     next X
2120     MOUSE2( Y )=ADD: ADD=0: SHADOW( Y )=ADD2: ADD2=0
2130  next Y
2140  gosub CHANGE
2150 return
2160 '
2170 '-----------------------------------------------------------
2180 SAVEA:
2190  gosub INFILE
2200  if RET then return
2210  open "O", #1, FILE$
2220  for Y=1 to 16
2230     for X=1 to 16
2240          if RET then return
```

continued on next page

```
2250            print  #1,MOUSE( X, Y )
2260        next X
2270     next Y
2280     close #1
2290    return
2300    '
2310    '-----------------------------------------------------------------
2320    LOADA:
2330     gosub INFILE: close #1
2340     if RET then return
2350     open "I", #1, FILES$
2360     for Y=1 to 16
2370        for X=1 to 16
2380            input #1, MOUSE( X, Y )
2390        next X
2400     next Y
2410     close #1: gosub DISARRAY
2420    return
2430    '
2440    '-----------------------------------------------------------------
2450    SVE:
2460     gosub INFILE
2470     if RET then return
2480     open "O", #1, FILE$
2490     print  #1, HOTX; HOTY; MASKC; POINTC
2500     for A=1 to 16
2510        print  #1, SHADOW( A )
2520     next A
2530     for A=1 to 16
2540        print  #1, MOUSE2( A )
2550     next A
2560     close #1
2570    return
2580    '
2590    '-----------------------------------------------------------------
2600    LOD:
2610     gosub INFILE
2620     if RET then return
2630     open "I", #1, FILE$
2640     input #1, HOTX, HOTY, MASKC, POINTC
2650     for A=1 to 16
2660        input #1, SHADOW( A )
2670     next A
2680     for A=1 to 16
2690        input #1, MOUSE2( A )
2700     next A
2710     close #1
2720     gosub CHANGE
2730    return
2740    '
2750    '-----------------------------------------------------------------
2760    DRAW:
2770     if( MX<129 )*( MY>20 )*( MY<149 )then 2780 else return
2780     X2=int( MX/8 )+1: Y2=int(( MY-21 )/8 )+1
2790     if MOUSE( X2,Y2 )then MOUSE( X2, Y2 )=0: F=0 else gosub XDRAW
2800     color 1, F, 10: fill X2*8-4, Y2*8-4: gosub VIEW
2810    return
2820    '
2830    '-----------------------------------------------------------------
2840    XDRAW:
2850     if( BUTTON=LEFT )+( BUTTON=BOTH )then MOUSE( X2,Y2 )=1: F=2
2860     if BUTTON=RIGHT then MOUSE( X2, Y2 )=2: F=3
2870    return
2880    '
2890    '-----------------------------------------------------------------
2900    CHANGE:
2910     poke CONTRL,111: B=0: C=0: poke CONTRL+2,0: poke CONTRL+6,37
2920     poke INTIN,HOTX: poke INTIN+2, HOTY
```

```
2930   poke INTIN+4,1: poke INTIN+6,MASKC: poke INTIN+8,POINTC
2940   for A=10 to 40 step 2
2950      B=B+1: poke INTIN+A,SHADOW( B )
2960   next A
2970   for A=42 to 72 step 2
2980      C=C+1: poke INTIN+A,MOUSE2( C )
2990   next A
3000   vdisys(0)
3010  return
3020  '
3030  '------------------------------------------------------------
3040  CLEARLIN:
3050   gotoxy 0,15: print  "                                      "
3060  return
3070  '
3080  '------------------------------------------------------------
3090  INFILE:
3100   FILE$="": gosub CLEARLIN: gotoxy 0,15: input "FILENAME ",FILE$
3110   if FILE$="" then RET=TRUE else RET=FALSE
3120  return
3130  '
3140  '------------------------------------------------------------
3150  DISARRAY:
3160   for Y=1 to 16
3170      for X=1 to 16
3180           A=MOUSE( X, Y )
3190           if A=0 then CO=0
3200           if A=1 then CO=2
3210           if A=2 then CO=3
3220           color 1, CO, 10: fill X*8-4, Y*8-4: X2=X: Y2=Y: gosub VIEW
3230      next X
3240   next Y
3250  return
3260  '
3270  '------------------------------------------------------------
3280  ROUND:
3290   poke CONTRL,11: poke CONTRL+2,2: poke CONTRL+6,0: poke CONTRL+10,9
3300   poke PTSIN,X: poke PTSIN+2,Y: poke PTSIN+4,X2: poke PTSIN+6,Y2
3310   VDISYS( 1 )
3320  return
3330  '
3340  '------------------------------------------------------------
3350  GRAFMOUSE:
3360   A#=GB: IIN=peek( A#+8 ): poke IIN,0: gemsys( 78 )
3370  return
3380  '
3390  '------------------------------------------------------------
3400  HOTSPOT:
3410   gotoxy 0, 15: print "Press left button on HotSpot"
3420   gosub BTFWAIT: gosub BTOWAIT: X2=int( MX/8 ): Y2=int(( MY-21 )/8 )
3430   gosub CLEARLIN: gotoxy 0,15: print "HotSpot is at ";X2;",";Y2
3440   if( X2<0 )+( X2>15 )+( Y2<0 )+( Y2>15 )then RET=TRUE: return
3450   HOTX=X2: HOTY=Y2: RET=FALSE
3460   gotoxy 0,15: input "Mask color, Pointer color ",MASKC,POINTC
3470  return
```

Checksum for file: mousedit.bas

1000 :07FA	1080 :0409	1160 :00EF	1240 :00EE	1320 :02C6	1400 :053B
1010 :0879	1090 :040B	1170 :0663	1250 :0C02	1330 :0367	1410 :053F
1020 :097D	1100 :03B8	1180 :057B	1260 :0229	1340 :00EF	1420 :0678
1030 :00EB	1110 :02C4	1190 :0505	1270 :0631	1350 :0C03	1430 :052C
1040 :0B6E	1120 :02C4	1200 :0D98	1280 :04AA	1360 :03C9	1440 :0369
1050 :065D	1130 :032F	1210 :04F5	1290 :02CC	1370 :01F5	1450 :00F1
1060 :0EFF	1140 :040C	1220 :0273	1300 :062B	1380 :0532	1460 :0C05
1070 :0A1F	1150 :0562	1230 :01FD	1310 :04A4	1390 :0426	1470 :0381

continued on next page

1480 :0DCC	1810 :0C04	2140 :048D	2470 :06D6	2800 :0C56	3130 :00EE
1490 :0DCA	1820 :031F	2150 :0368	2480 :0503	2810 :036B	3140 :0C02
1500 :09E8	1830 :05B1	2160 :00F0	2490 :09F0	2820 :00F3	3150 :0362
1510 :0A0E	1840 :0A3B	2170 :0C04	2500 :0407	2830 :0C07	3160 :0422
1520 :0982	1850 :00F5	2180 :0275	2510 :05CD	2840 :028E	3170 :0422
1530 :0976	1860 :0C09	2190 :04A3	2520 :02C9	2850 :0F1C	3180 :0401
1540 :09BF	1870 :031B	2200 :06CD	2530 :040A	2860 :0B5F	3190 :04F8
1550 :09B3	1880 :05B6	2210 :04FA	2540 :05C5	2870 :0371	3200 :04F3
1560 :03DA	1890 :0A45	2220 :041E	2550 :02CC	2880 :00F9	3210 :04F6
1570 :0693	1900 :00F1	2230 :041E	2560 :0337	2890 :0C0D	3220 :0EEF
1580 :0521	1910 :0C05	2240 :06D1	2570 :036E	2900 :02AB	3230 :02DF
1590 :02CF	1920 :0241	2250 :062D	2580 :00F6	2910 :1005	3240 :02E1
1600 :0403	1930 :046C	2260 :02E1	2590 :0C0A	2920 :0AA5	3250 :036A
1610 :0368	1940 :0BEF	2270 :02E3	2600 :01E1	2930 :0FE9	3260 :00F2
1620 :00F0	1950 :0997	2280 :0336	2610 :04A0	2940 :062A	3270 :0C06
1630 :0C04	1960 :059B	2290 :036D	2620 :06D3	2950 :0849	3280 :028F
1640 :02C5	1970 :059C	2300 :00EC	2630 :04FA	2960 :02D1	3290 :1277
1650 :03DF	1980 :0810	2310 :0C00	2640 :09C3	2970 :0637	3300 :11FB
1660 :0674	1990 :0373	2320 :0262	2650 :040D	2980 :0844	3310 :032B
1670 :03DD	2000 :00E9	2330 :0743	2660 :05D6	2990 :02D4	3320 :0368
1680 :02C4	2010 :0BFD	2340 :06D2	2670 :02CF	3000 :03E6	3330 :00F0
1690 :0FE9	2020 :0271	2350 :04F9	2680 :0410	3010 :0364	3340 :0C04
1700 :09DD	2030 :052F	2360 :0423	2690 :05CE	3020 :00EC	3350 :03AE
1710 :02C9	2040 :0517	2370 :0423	2700 :02C9	3030 :0C00	3360 :0CC1
1720 :022C	2050 :073E	2380 :0634	2710 :0334	3040 :034B	3370 :036D
1730 :10E2	2060 :0420	2390 :02E5	2720 :0491	3050 :06DF	3380 :00F5
1740 :0E43	2070 :0420	2400 :02DE	2730 :036C	3060 :0369	3390 :0C09
1750 :0C03	2080 :03FF	2410 :07EA	2740 :00F4	3070 :00F1	3400 :0332
1760 :036E	2090 :07BF	2420 :0368	2750 :0C08	3080 :0C05	3410 :10E1
1770 :00F6	2100 :081C	2430 :00F0	2760 :0237	3090 :02BD	3420 :11A3
1780 :03AD	2110 :02DB	2440 :0C04	2770 :0DF2	3100 :1132	3430 :123D
1790 :0620	2120 :0B24	2450 :01F3	2780 :0984	3110 :0BAC	3440 :0E9A
1800 :00F0	2130 :02DE	2460 :04A3	2790 :102F	3120 :0366	3450 :07E9
					3460 :1352
					3470 :036E

ST RESOURCE

CHANGEMOUSE

Article on page 57

LISTING 2

```
10000  end
10010  '
10020  'Listing 2
10030  '(c) 1986 Antic Publishing Ver. 070286
10040  'Written by Kevin Kennedy
10050  '
10060  'Use this subroutine in your own program
10070  'to read in and change the current mouse shape.
10080  '
10090  CHANGEMOUSE:
10100   open "I", #1, FILENAME$
10110   input #1, HOTX, HOTY, MASKC, POINTC
10120   poke CONTRL, 111: poke CONTRL+2, 0: poke CONTRL+6, 37
10130   poke INTIN, HOTX: poke INTIN+2, HOTY
10140   poke INTIN+4,1: poke INTIN+6, MASKC: poke INTIN+8, POINTC
10150   for A=10 to 40 step 2
10160      input #1, SHADOW
```

```
10170        poke INTIN+A, SHADOW
10180     next A
10190     for A=42 to 72 step 2
10200        input #1, MOUSE
10210        poke INTIN+A, MOUSE
10220     next A
10230     close #1
10240     vdisys( 0 )
10250 return
```

Checksum for file: changems.bas

10000 :0232	10040 :09AF	10080 :0120	10120 :0E5A	10160 :056E	10200 :052C
10010 :0119	10050 :011D	10090 :0463	10130 :0ACD	10170 :0688	10210 :0646
10020 :0426	10060 :0F45	10100 :0642	10140 :1011	10180 :02FA	10220 :02F5
10030 :08AB	10070 :10BA	10110 :09EA	10150 :0652	10190 :0660	10230 :0360
					10240 :041A
					10250 :0398

Help!

ACOUSTIC 830

The old Atari 830 rubber-cup acoustic modem was mistakenly called an 835 in *BAAUG Speaks Out* (August, 1986). The Atari 835 was actually a direct-connect modem that plugged straight into your phone jack and your computer—the predecessor of the 1030.

FILE MASTER

If *File Master* (**Antic**, August 1986) is not working properly for you, change the 100 in line 2625 to a 90. The problem occurs in some combinations of DOSs and disk drives.

Also, we discovered after publication that *File Master* is apparently based closely on a public domain program which was originated in 1981 by Stacy Goff of the Eugene (OR) Atari Computer Enthusiasts.

PRO FORTRAN-77

A number of Fortran-knowledgeable readers disagreed with the Sieve of Eratosthenes speed test which clocked Prospero Pro Fortran-77 (**Antic**, August 1986) at 11 minutes and 8 seconds. It turns out that the dissenters are correct, and **Antic** is grateful to everyone who alerted us to the error.

The reviewer insisted that he ran his test many times, always with the same result. But when he sent us the Fortran source code he wrote for the test, we took a close look and discovered a *one-character mistake!* Unfortunately, this is the maddening kind of bug that can sometimes creep into the work of even the most experienced software developers, such as our reviewer.

We've reprinted the corrected Pro Fortran-77 Sieve test below. Look at the line right below line 50. This line starts a DO loop which uses the integer K as a counter. The snail-paced original program contained a J as the counter.

Since the line right below the start of the loop was testing for IFLG(K), the program took a long time to find a match.

The corrected version runs in less than *three seconds*—considerably faster than the 11 minutes reported in the review. In fact, Pro Fortran-77 runs at virtually a dead heat with the 2:53 seconds turned in by Digital Research's Alcyon C.

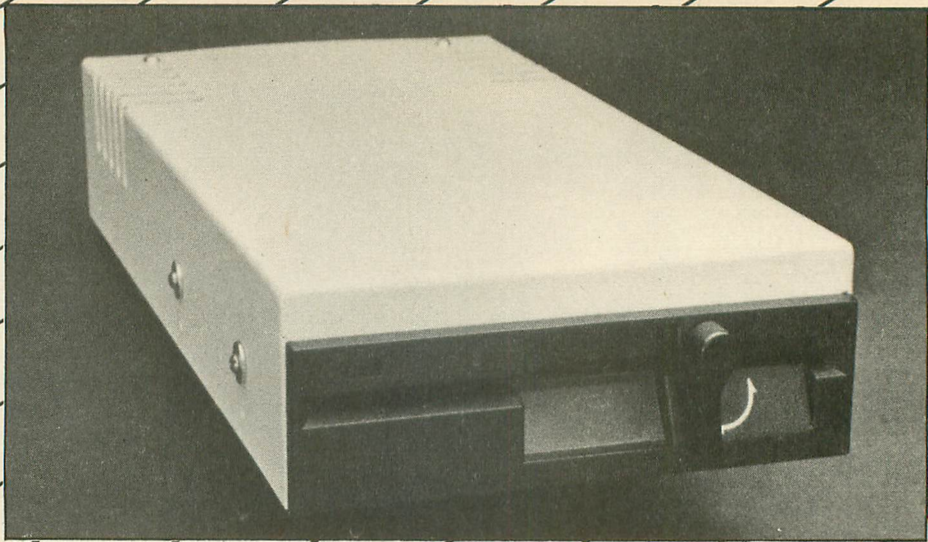
```
      PROGRAM SIEVE
C   THIS IS THE 'Corrected' SIEVE PROGRAM FOR TESTING FORTRAN

      LOGICAL*2 IFLG(8191)
      INTEGER*2 ICT,ITER,I,IPRIME

      WRITE(*,100)
100   FORMAT(' SEIVE 10 INTERATIONS '/)
      CALL TIME(IHOURS,MINS,ISECS,IHUND)
      WRITE(*,200) IHOURS,MINS,ISECS,IHUND
200   FORMAT(' START TIME=',I2,':',I2,':',I2,'.',I2/)
      DO 20 ITER = 1,9,1
        ICT=0
        DO 30 I= 0,8190,1
          IFLG(I)=.TRUE.
 30     CONTINUE
        DO 40 I= 0,8190,1
          IF (IFLG(I)) THEN
 50         IPRIME = I+I+3
            DO 60 K=I+IPRIME,8190,IPRIME
              IFLG(K)=.FALSE.
 60         CONTINUE
            ICT=ICT+1
          ENDIF
 40     CONTINUE
 20   CONTINUE
      CALL TIME(IHOURS,MINS,ISECS,IHUND)
      WRITE(*,300) IHOURS,MINS,ISECS,IHUND
300   FORMAT(' STOP TIME=',I2,':',I2,':',I2,'.',I2/)
      WRITE(*,400)
400   FORMAT(' THAT''S ALL FOLKS')

      END
```

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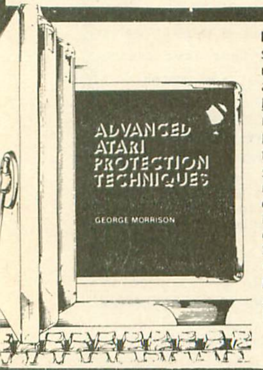


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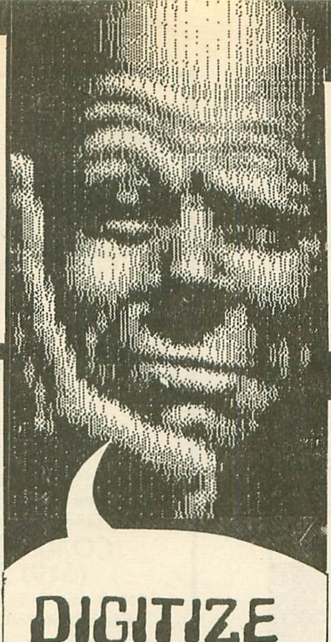


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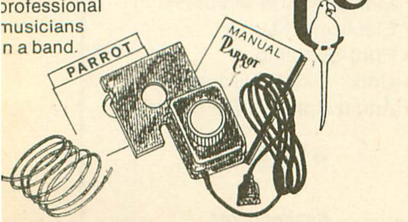
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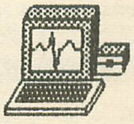
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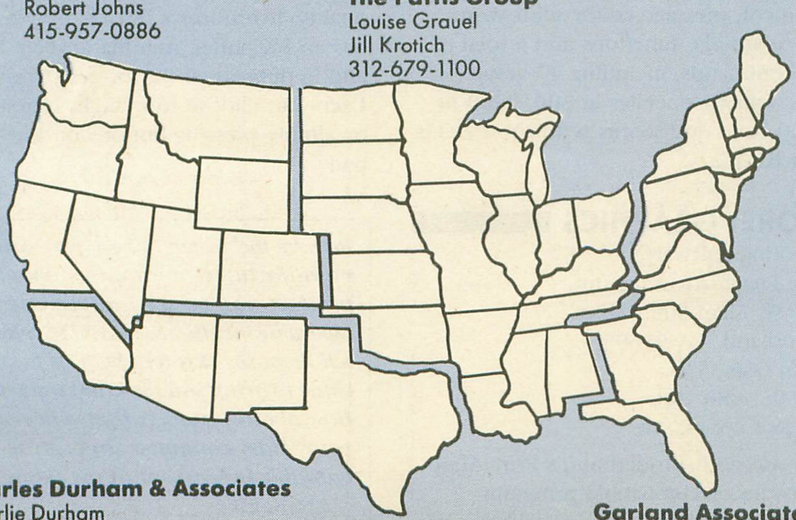
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Lincolnwood, IL 60646
LOUIS GRAUEL
JILL KROTICH
617-749-5852

Garland Associates
10 Industrial Park Rd.
Hingham, MA 02043
PETER HARDY
617-749-5852

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Advertising Production Coordinator
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San Francisco, CA 94107

New Products

*New Products notices are compiled by the **Antic** staff from information provided by the products' manufacturers. Antic welcomes such submissions, but assumes no responsibility for the accuracy of these notices or the performance of the products listed.*

HARDBALL

(entertainment software)
Accolade
20833 Stevens Creek Blvd.
Cupertino, CA 95014
(408) 446-5757
$29.95, 48K disk
CIRCLE **215** ON READER SERVICE CARD

HardBall gives you command of the physical action and strategic decisions of baseball—in colorful 3-D perspective. Hit and run. Steal. Sacrifice. Leap for long fly balls or dive for grounders. Play Ball!

CARDIAC ARREST!

(educational software)
Mad Scientist Software
2063 North 820 West
Pleasant Grove, UT 84602
(801) 785-0535
$69, 48K disk
CIRCLE **216** ON READER SERVICE CARD

Cardiac Arrest! is a training simulation in the form of a a video game. It has been used in hospital classes by emergency physicians, nurses and paramedics. It is particularly valuable for reviewing the treatment of rare causes of cardiac arrest. Now available to the public, this program challenges you to think your way to the right treatment under emergency conditions.



PROMODEM 2400

(modem)
Prometheus Products Inc.
4545 Cushing Parkway
Fremont, CA 94538
(415) 490-2370
$595
CIRCLE **221** ON READER SERVICE CARD

Promodem 2400 operates at 300, 1200 and 2400 baud. It is Hayes-compatible, has a built-in speaker and two phone jacks, auto-redial and call monitoring. It offers several add-on modules, including an optional plug-in Communications Buffer ($149) that can be expanded to 512K. Another option is a 12-character front panel alphanumeric display ($99) that shows time and online status.

SF/JAPAN SCENERY DISKS

(flight simulation)
SubLogic Corp.
713 Edgebrook Drive
Champaign, IL 61820
(800) 637-4893—National
(217) 359-8482—Illinois
$19.95 each, 48K disk
CIRCLE **217** ON READER SERVICE CARD

Fly beneath the Golden Gate Bridge. The **San Francisco STAR Scenery Disk** covers the San Francisco area in great detail. The **Japan** disk lets you practice flying in the area from Tokyo to Osaka. Sublogic's scenery disks require are not stand-alone programs; they require either Flight Simulator I or II, or Jet.

CARINA BBS

(telecommunications)
Carina Software Systems
12390 57th Road North
Royal Palm Beach, FL 33411
(305) 793-2792
$69.95, 48K disk
CIRCLE **220** ON READER SERVICE CARD

This expandable, module-based bulletin board software package is written in understandable BASIC and includes XMODEM upload/download transfer protocol, message editor with word processor-like functions and a total of 44 commands, including 17 sysop functions. It operates at 300, 1200 or 2400 baud and works with most DOSs and BASICs.

MORE! GRAPHICS

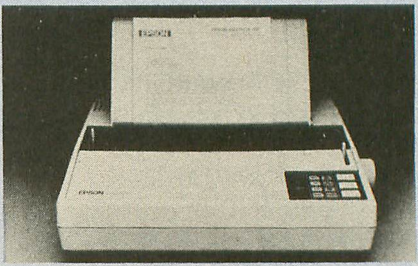
(printing software)
The Pierstorff Company
131 W. Main Street
Woodland, CA 95695
(916) 666-3530
$19.95, 48K disk
CIRCLE **218** ON READER SERVICE CARD

For use with Broderbund's Print Shop software or compatible programs, **More! Graphics** contains a library of 128 designs, symbols, characters and letters, plus 11 background designs for overlaying text or numbers.

MARK 4:22

(computer stand)
BMW and Associates
515 Michigan Avenue
Troy, OH 45373
(513) 335-2092
$99.95
CIRCLE **223** ON READER SERVICE CARD

This sturdy steel workstation organizer with black plastic trim gets your power supplies and cables out of the way. It holds two Atari 1050 disk drives, has a place for your 8-bit Atari computer and can support a monitor, a hard disk and whatever else you can fit on top of it.



EPSON EX-800

(printer)
Epson America
2780 Lomita Blvd.
Torrance, CA 90505
(800) 421-5426—National
(213) 539-9140—California
$749
CIRCLE **225** ON READER SERVICE CARD

This speedy dot matrix printer is rated by Epson at 250 characters per second in draft speed and 45 cps in near letter quality. It features a 7-color option and has an 8K buffer. Automatic sheet load and bi-directional tractor are standard. Users can choose from eight typestyles by simply pressing buttons on the top panel.

Return the favor. When you call a manufacturer or supplier about a product you've seen advertised or otherwise mentioned in ANTIC, please tell them so. This will help us to continue to bring you the latest information about products that will make your Atari computer an even more valuable investment in the future.
—ANTIC ED



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Air Rescue: Sensational assault chopper rescue raids for daring pilots in solo or team configuration. For one to eight players.
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Screen shots from Commodore 64
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